FEDERAL FINANCIAL SYSTEMS MARKET

1990 - 1995

INPUT

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*Federal Financial Systems Market,
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Abstract

INPUT estimates that the federal government financial systems market will increase from $95 million in 1990 to $146 million in 1995, a compound annual growth rate of 9%

This growth will be sustained by increasing agency compliance with federal regulations concerning financial systems. Software products will show the fastest growth as more products become certified as JFMIP core compliant. Professional services, especially software development, justify much of the growth in the market.

Although there are currently very few vendors with core-compliant software, the products will be under continuing competitive pressure, thus holding down the prices. Hardware is not regulated by the government in the federal financial systems market, so success by hardware vendors will be dependent on alliances with software vendors.

This report contains 88 pages, including 16 exhibits.

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Exhibits

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https://archive.org/details/federalfinancialunse
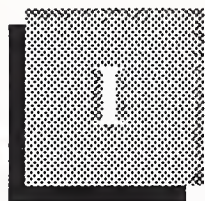
Introduction

Federal Financial Systems is a new INPUT report. It has been prepared as a result of the growing importance of this market to vendors providing equipment, software, and services to federal agencies. Financial systems will have ramifications in other federal areas, like DoD's Corporate Information Management (CIM) initiative. CIM is expected to consolidate most DoD software into twelve functional categories, with common ground rules for compatibility. Currently, Army's Standard Financial System - Redesign (STANFINS-R) is expected to replace comparable systems in the Navy and the Air Force.

Federal Financial Systems identifies issues concerning the federal agencies, trends within the market, regulations facing vendors that wish to enter the market, and the role of the Joint Financial Management Improvement Program (JFMIP). Insights into agency requirements and perceptions, and contractor guidance, are offered to help vendors plan their strategies to compete for federal financial systems contracts.

Federal Financial Systems is presented in a new style that has not been previously presented to INPUT's clients in the Federal Program. It covers only the market issues, without surveying vendors for their thoughts. The report is also shorter than regular INPUT Market Analysis Reports. For these reasons, it is considered an issue paper.

This paper was prepared as part of INPUT's Federal Information Systems and Services Program (FISSP). Market analyses issued through this program are designed to assist INPUT's U.S. industrial clients in planning how to satisfy future federal government needs for computer-based information systems and services. The report's findings are based on research and analysis of several sources, including:

- Interviews with federal agency financial systems managers
- Interviews with federal oversight agency representatives
- INPUT's Procurement Analysis Reports (PARs)
- Federal guidelines and reports on financial systems
- Various secondary research sources

A
Scope

The material in this document provides a supplement to INPUT's previous reports on software and related services and on professional services. It is intended to give INPUT's clients a clear description of the current status and future trends of the federal financial systems market. It also identifies the key vendors in the market.

Financial reporting requirements are the focus of this report, as are the various oversight agencies' roles in enforcing the requirements. The report identifies the impact of budget constraints on the market. Finally, the costs to vendors who want to enter the market are specified.

B
Methodology

INPUT used several sources and methods to develop this report. Methods included surveys of agency officials, analysis of planned federal procurements involving financial systems, analysis of federal guidelines and directives involving financial systems, and collection and synthesis of available secondary research.

Separate questionnaires were developed for agency financial program managers and oversight agency officials (see Appendixes G and H).

- The agency program manager questionnaire was designed to acquire information about the effect of the Joint Financial Management Improvement Program (JFMIP) on federal financial systems and the awareness level of agencies with regard to all financial system regulations.

- The oversight agency questionnaire was designed to acquire information on the future role of JFMIP and other upcoming system requirements that could affect this market.

INPUT reviewed agency long-range plans and the Procurement Analysis Reports (PARs) to develop details of agency activities. Many PARs cover programs or initiatives that do not appear in the agency budget submissions. These sources permit a better understanding of market direction.

INPUT also attended the day-long JFMIP 19th Annual Conference in Washington, D.C., which included discussion of key financial management issues by high-level agency and Cabinet officials. INPUT used other JFMIP background reports to develop this report.

C
Report Organization

Besides the introduction and appendixes, this report consists of four chapters:

- Chapter II contains an executive overview describing the major points and findings in the report.

- Chapter III discusses the main issues surrounding the federal financial systems market and the views of federal agency personnel, in addition to presenting a market forecast.

- Chapter IV contains competitive considerations for current and future software vendors and for hardware vendors.

- Chapter V provides a sample of financial systems opportunities in the federal market. In addition, various appendices are included.

II
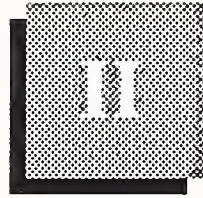
Executive Overview

This executive overview presents the main ideas of this report in a condensed version.

A
Federal Market Issues

The federal financial systems market has taken new direction since the issuance of the JFMIP core requirements in January 1988. Exhibit II-1 summarizes the federal financial market issues. Federal agencies incorporated these requirements into their criteria for financial software. Along with other initiatives, such as the Financial Integrity Act requirements and Reform 88, the core requirements have provided central guidance to all federal agencies. The JFMIP will be providing other requirements to the agencies in the near future for payroll/personnel systems, travel systems, and human resources systems.

EXHIBIT II-1

Federal Market Issues

- Regulations stimulate growth

- Substantial investment needed

- Core-compliant systems are expensive

- Alternative approaches exist

- Exemptions are possible

Vendors that are interested in this market must make a substantial investment to develop core-compliant software. This need arises from the unique nature of government accounting systems. According to JFMIP, most vendors believe that the federal financial market is limited. This limitation discourages vendors from making the necessary investment.

The cost of acquiring new financial software may restrict agencies in their procurement efforts. The financial software itself may not be that costly, but the expenses required for the customization services can render the system cost prohibitive. Conversely, these support services represent the greatest profit potential for vendors. The agencies are still experiencing tight information systems budgets. Thus there is not a lot of funding readily available for financial systems.

Agencies may choose among several alternatives to the procurement of a financial system—including cross-servicing, which is the production of an agency's financial reports on another agency's computer system. As another alternative, some agencies may choose to acquire a site license for financial software from another agency that has already purchased the financial software. Under a third alternative, remote agencies across the country have the option to acquire PC-based software that has been developed for small businesses. Some other agencies that cannot afford core-compliant software may try to obtain an exemption from GSA so that they do not have to acquire software that is core-compliant.

B
Procurement Vehicles

Several types of procurement vehicles for federal financial systems are listed in Exhibit II-2.

EXHIBIT II-2

Procurement Vehicles

- GSA schedule
- Hardware upgrades
- PC-based accounting software

Most federal agencies will acquire core-compliant software through the GSA schedule. Although a substantial investment is required to produce core-compliant software, the market can be very profitable. Many agencies already have core-compliant software, but this existing software is aging and in some cases may not actually be compliant with the Standard General Ledger requirements. Thus the existing software would have to be replaced or enhanced.

Several other procurements, primarily recompetitions for hardware systems, will take place in 2-3 years in both civilian and defense agencies. The hardware procurements will include requirements for financial systems, but financial systems will not be the only application to run on

the hardware. However, because of the JFMIP core requirements, the hardware will have to support core-compliant software. The out-years may see a greater number of procurements for financial systems as GAO completes its audits of agency financial systems.

Vendors with PC-based accounting software may also see a gain in their sales. Remote government office locations are in dire need of affordable accounting software. These locations usually have IBM or IBM-compatible microcomputers to run their applications. Vendors with low-cost comprehensive accounting software have a great opportunity in this market.

C
Market Forecast

INPUT expects that the federal financial systems market will grow from $95 million in FY1990 to $146 million in FY1995, at a compound annual growth rate (CAGR) of 9%. Exhibit II-3 displays a subdivision of this market into three segments.

EXHIBIT II-3
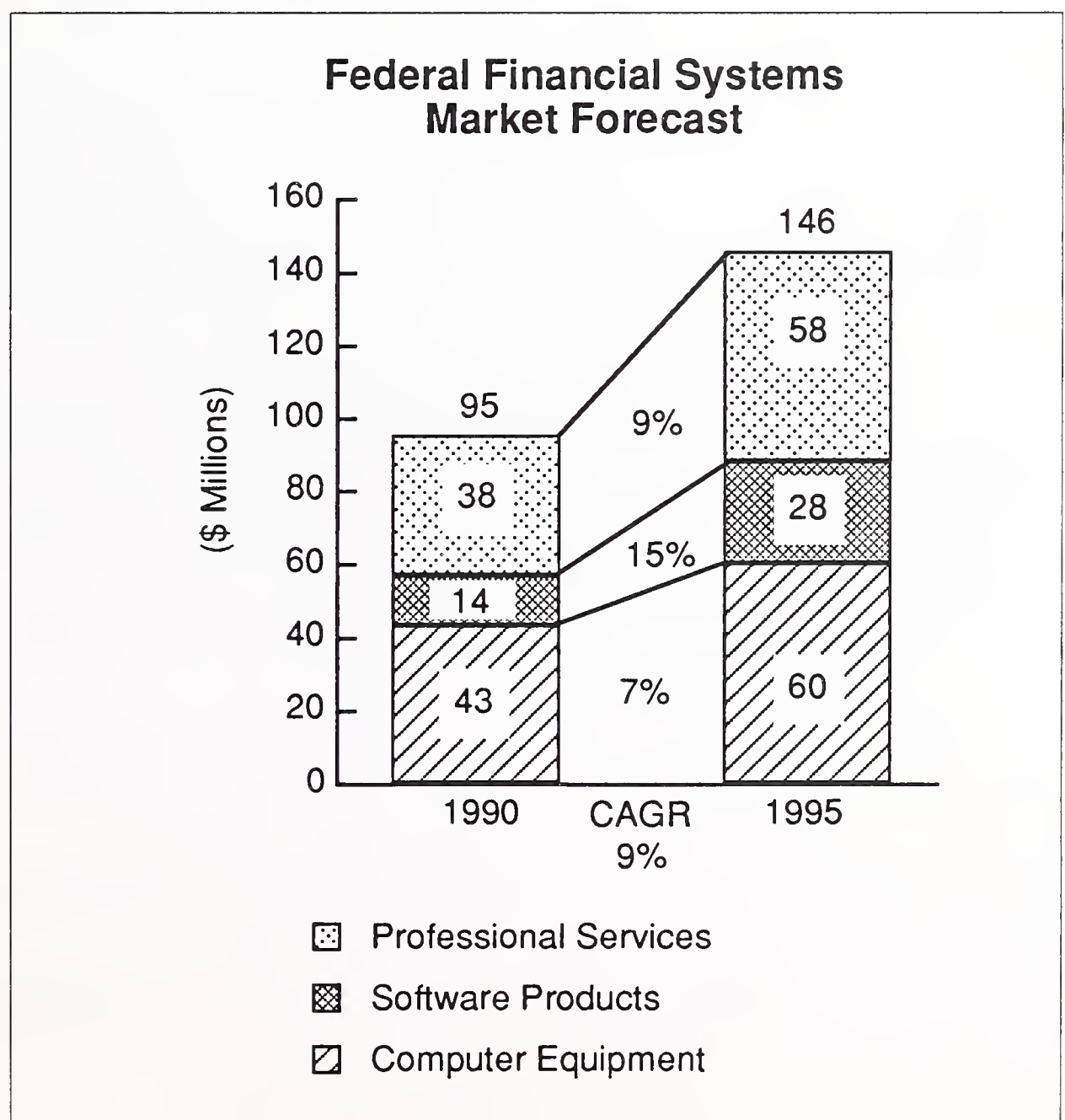
**Federal Financial Systems
Market Forecast**

($ Millions)

	1990	CAGR 9%	1995
Professional Services	38	9%	58
Software Products	14	15%	28
Computer Equipment	43	7%	60
Total	**95**		**146**

☐ Professional Services

▨ Software Products

▧ Computer Equipment

As noted in the exhibit, software products will show the fastest growth rate (15%) as more products become certified as JFMIP core compliant. However, associated professional services, particularly software development, will continue to account for a much larger share of the market. This share increase reflects a continuing demand for tailoring of the software products to meet agency-specific needs. The products themselves will be under continuing competitive pressure, thus holding down the prices.

On the hardware side, INPUT expects mid-size systems to account for the bulk of the sales, although microcomputers dedicated primarily to financial systems will likely also increase.

D
Leading Vendors

There are currently only three vendors that have had their software approved for the GSA schedule. These vendors are American Management Systems, Computer Data Systems Incorporated, and KPMG Peat Marwick. Only AMS has sold a significant amount of software through the GSA schedule; the other vendors have not been as successful.

The agency respondents to the INPUT survey mentioned other software firms as leaders in this market. Exhibit II-4 lists financial software vendors. Ernst & Young, Management Science America, and Oracle are the firms that were thought to be leaders by agency respondents. Each of these firms will likely have software approved for the GSA schedule in the future. The respondents mentioned these firms because the respondents use the companies' software products. Although these firms do not have core-compliant software, they are perceived to be market leaders. This perception indicates that there is little name recognition within the agencies and that the market is open for penetration.

EXHIBIT II-4

Leading Federal Financial Software Vendors

- American Management Systems [1]
- Computer Data Systems Inc. [1]
- KPMG Peat Marwick [1]
- Ernst & Young [2]
- Management Science America [2]
- Oracle [2]

(1) Approved by GSA
(2) Approval likely

E
Recommendations

Exhibit II-5 lists recommendations for vendors interested in penetration of the federal financial systems market. First, software vendors interested in entering the market should contact the JFMIP for assistance. The JFMIP works with vendors to help them comply with the core requirements. In addition, the vendors should consult closely with agency financial officials to help determine future requirements. Vendors must also keep tabs on agency information systems long-range plans to determine when financial systems procurements might take place.

EXHIBIT II-5

Recommendations

- Contact the JFMIP for assistance
- Develop strategic alliances
- Offer custom programming services

Second, hardware vendors need to develop strategic alliances with software vendors providing core-compliant software. The agencies are taking the JFMIP core requirements seriously, and in most cases will not acquire computer systems that are not compliant. Thus hardware vendors need to make these alliances to ensure continued participation in this market.

Third, vendors must be prepared to offer custom programming services in addition to the software itself. Modifications to the software are a significant contribution to the total price of a financial system, because each agency requires different adaptations. Customization adds to the profit potential for this market. Extensive custom programming will remain necessary until the JFMIP releases more distinct and binding requirements for financial software systems.
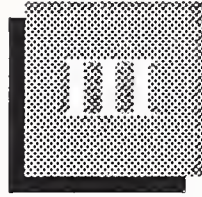
Market Analysis and Forecast

This chapter describes the issues driving the federal financial systems market and presents the forecast resulting from those issues.

A
JFMIP Background

The Joint Financial Management Improvement Program plays an important role in the development and standardization of federal financial systems. Working with the federal agencies, JFMIP brought about the first action to regulate software for federal financial systems.

The General Accounting Office, the Department of the Treasury, and the Bureau of the Budget (now the Office of Management and Budget) in 1948 began an effort to promote more effective and efficient financial systems in the government. These central agencies also agreed to coordinate the interrelated financial activities and responsibilities of the central agencies. In 1949 the three central agency heads signed a formal agreement that set forth the policies, objectives, and work areas for the Joint Financial Management Improvement Program (JFMIP).

In the late 1940s, agency financial management systems were complex and inadequate for management purposes. Central financial agencies' communications resulted in conflicting or duplicative requirements for the program agencies. The need to develop better financial management systems to provide management with useful and timely information was recognized. The JFMIP concentrated its initial efforts on resolving these basic problems.

In 1966, the Civil Service Commission (now the Office of Personnel Management) was invited to join the JFMIP central agencies to help with personnel matters. Since 1984, a key official from each central agency has served on the Steering Committee. The agencies that now sponsor JFMIP are listed in Exhibit III-1.

EXHIBIT III-1

Agencies Sponsoring JFMIP

- GAO
- Treasury
- OPM
- OMB

The JFMIP Steering Committee has six members, one from each central agency, plus the JFMIP Executive Director and a representative from a program agency. The Steering Committee develops goals and objectives for guiding the improvement of financial management across government. It also promotes strategies for achieving these objectives. Central agencies' policies and initiatives of common interest are discussed and coordinated through the Steering Committee.

The head of each federal agency designates a liaison representative to JFMIP. Each agency liaison representative serves as the first contact point for project ideas, recruiting members for project work, reviewing JFMIP studies and reports, collecting data for studies, and disseminating information to others within their organizations.

An interagency task force developed uniform core requirements for agency financial management systems. These requirements were issued in January 1988 by JFMIP and subsequently incorporated into JFMIP's standards, regulations, and directives. The General Services Administration, in conjunction with OMB, used these requirements to determine criteria for its procurement award schedule for commercial accounting software packages for federal government use.

B
Financial System Standardization Measures

There are several JFMIP core requirements, as shown in Exhibit III-2.

EXHIBIT III-2

JFMIP Core Requirements

- General functional requirements
- Accounting functional requirements
- General support requirements
- ADP system requirements

The general functional requirements consist of:
- Accounting classification code structure
- Reporting
- Audit/internal controls

The accounting functional requirements consist of:
- General ledger
- Budget execution/funds control
- Accounts payable
- Accounts receivable
- Cost accumulation

The general support requirements are addressed in four areas:
- Training and user support
- Documentation
- Technical support services
- Maintenance/updates

The ADP systems requirements are the general requirements that apply governmentwide and are not intended to identify all of the ADP systems requirements for specific departments or agencies. This means that JFMIP is not regulating hardware for financial systems.

These requirements are implemented in agency functional requirements, agency technical requirements, agency integration strategy, and software/hardware evaluation. The agencies select JFMIP core-compliant software appropriate for their use, and then adapt it to their systems.

The core requirements are high-level documents. These requirements provide an umbrella of general requirements that cover many but not all aspects of financial systems. The vendors of financial software now have guidance on how to target systems development because of the core requirements. Compliance is regarded more seriously by the agencies and the vendors because of this set of documents.

Exhibit III-3 lists other regulations that were not developed by JFMIP,but have had a positive effect on federal financial systems.

EXHIBIT III-3

Federal Regulations and Initiatives

- Financial Integrity Act
- Reform 88
- OMB Circular A-127
- GAO Title 2
  - Core financial systems requirements
  - Standard General-Ledger definition

An important regulation affecting the financial systems market is the Financial Integrity Act, which was passed by Congress in 1982 to reform financial management. The Financial Integrity Act requires agencies to assess their vulnerability to fraud, waste, and abuse; identify material control weaknesses to the president; and furnish the president and Congress with plans to correct weaknesses. To date, however, there has been a lack of progress. As reported by GAO, financial waste and mismanagement are still common and have resulted in billions of dollars in wasteful spending.

According to a statement by Donald B. Chapin, Assistant Comptroller General, the GAO sees little overall improvement in the condition of controls throughout the government since passage of the Financial Integrity Act. This statement is contained in testimony (dated January 23, 1990) before the Subcommittee on HUD/Moderate Rehabilitation Investigation, GAO publication GAO/T-AFMD-90-14. Agency actions to improve controls frequently have taken the form of system improvement plans that were not well executed. Although the Financial Integrity Act has alerted oversight agencies to the problems of government, not enough has been done to correct the problems reported. If the government is ever to achieve the act's objectives, emphasis must shift from merely reporting under the act to correcting long-standing weaknesses.

The recurring theme throughout Chapin's testimony was that agencies must act efficiently to correct deficiencies, not simply report them. No effective mechanism exists to ensure that agencies take the needed corrective actions. GAO has urged that agencies should be required to link the Financial Integrity Act internal control review and reporting process with the budget process. Agencies should identify corrective actions that require incremental funding and major reprogramming in the current budget. This identification should assist senior decision makers in assessing the magnitude of corrective action funding requirements.

Another federal initiative from OMB, Reform 88, has strongly affected the federal financial systems market. Reform 88 aimed to eliminate the incompatible, redundant, and obsolete financial systems. It called on every major agency to develop a compatible primary financial system by 1988. Not all of the Reform 88 goals, however, have been met. None of the federal agency respondents to this survey mentioned Reform 88 as a regulation that has played an important part in the financial systems market. Apparently Reform 88 is a very high level document that has no bearing on the selection of systems.

The agency respondents to this survey did mention other regulations that are important in the financial systems market. OMB Circular A-127, published on December 11, 1984, was mentioned by the survey respondents, as was GAO Title 2. Under Circular A-127, "Financial Management Systems," agencies must certify that their financial systems are compliant with the JFMIP core requirements. Title 2 contained the core financial system requirements along with the Standard General Ledger (SGL) definition and describes the minimum functions of a federal financial system. SGL was created as a uniform way for agencies to report on budgets, revenues, and expenditures; maintain asset and liability balances; and control subsidiary accounts. SGL is supervised by the Department of the Treasury's Financial Management Service.

The emphasis to date in the reform of federal financial systems has been on financial reporting to Treasury and OMB. There will be, however, expansion in the reporting areas under standardization. The JFMIP has other initiatives underway to standardize financial information. These newer initiatives follow up on the core financial system requirements. Although the new requirements will be functionally compatible with the earlier requirements, the expansion of the reporting requirements could mean new procurements of compliant systems. As the new requirements are added, agencies may have to add on to or replace their current systems. This is a possible opportunity for vendors.

Other administrative and financial systems that are likely to be affected by JFMIP are listed in Exhibit III-4. The payroll/personnel requirements were published by JFMIP in May 1990. JFMIP is advising that cross-servicing between agencies be used to consolidate payroll/personnel

systems. Consolidation would avoid any new procurements by agencies for payroll/personnel systems.

EXHIBIT III-4

Types of Financial Systems Likely to Be Standardized by JFMIP

- Payroll/personnel

- Travel

- Human resources

JFMIP has sent an initial draft for the travel system requirements to a peer review group. The peer review group has a total of 30 days to study and make initial recommendations on the requirements. JFMIP will not publish these requirements until after the beginning of FY1991.

The agency users surveyed by INPUT are aware that additional financial reporting requirements will be demanded of them. Most of the agency respondents said that their agency intends to expand financial reporting requirements to other areas. The areas mentioned by the respondents include accounts receivable and greater accuracy in the external reports to Treasury and OMB. Agencies anticipate more restrictions and requirements on their financial systems because OMB, GAO, and Treasury are perceived to be constantly developing more requirements that restrict the individuality of the agency. The agency responses to the survey also seemed to indicate that the users of financial systems, as well as the oversight agencies, are demanding more capabilities and results from existing financial systems.

C
Agency Awareness of Regulations

Despite the reduction in the number of federal financial systems and the increased awareness of agencies with respect to the pertinent regulations, problems with financial management still remain. The GAO reviewed the agencies' reporting under the Financial Integrity Act and issued a report on November 29, 1989. It states that there are still serious breakdowns in internal control and financial management systems. The agencies are aware in many cases of the problems and deficiencies in their systems, but they have not corrected them. According to the report, no mechanism exists to ensure that agencies take corrective action. Because there is potential for more notorious problems such as the HUD crisis, GAO has developed plans for special audits to identify areas that are likely to result in financial losses. A list of the areas GAO intends to target has been compiled and is shown in Exhibit III-5.

EXHIBIT III-5

Initial Areas Selected for Special GAO Audit or Review

- Resolution Trust Corporation

- Internal Revenue Service Receivables

- Management of Seized and Forfeited Assets

- Questionable Medicare Claims

- ERISA/Pension Benefit Guaranty Corporation

- Guaranteed Student Loans

- State Department Real Property Management Overseas

- DoD Inventory Management Systems

- DoD Major Systems Acquistions

- NASA Contract Management

- Farmers Home Administration Loan Program

- Superfund Enforcement and Contractor Oversight

- Urban Mass Transportation Administration Grants

- Department of Energy Contractor Oversight

The GAO reports that the federal government has always stressed appropriation accounting and fund control. Although these areas are important parts of government financial management, they may be the only parts being seriously considered. Federal agencies need to know how well they are managing and controlling the resources they already have, especially in the face of increasing budget cuts.

The statement by Chapin for the congressional subcommittee also said that if the government is to strengthen its programs and run them in an efficient and economical manner, it must better manage its system improvement projects. The government has planned corrective actions and provided billions of dollars for financial management improvements. However, these efforts to improve existing systems and develop and acquire new automated systems have experienced and continue to experience massive problems.

The GAO also recently criticized the Air Force's inventory management financial systems. The GAO's audit found that the Air Force financial systems and practices are incapable of providing reliable financial information. The Air Force operates 131 different accounting and financial systems, and many are not coordinated through a general ledger. This produces unreliable financial reporting. The GAO stated that the true financial situation of the Air Force (and other agencies) has not been disclosed to the public, the Congress, OMB, and the Treasury. The agency managers did not understand the financial condition of their agencies before they tried to produce auditable financial statements. The financial information reported to the Congress and OMB by the Air Force was wrong by significant amounts.

The Air Force replied to the audit by stating that the GAO report did not prove any link between auditable financial statements and the ability to make key acquisition decisions. The Department of Defense Inspector General's office said that the report was unfair and that GAO offered no specific savings in its recommendation that improved systems be developed. In INPUT's view, this response avoids a specific defense of the fallibility of Air Force financial systems. In the future the Air Force will likely use the Army's Standard Financial System (STANFINS) as its primary financial system. STANFINS is under consideration as the primary financial system for all of the defense agencies.

OMB has also produced a list of problem areas in the agencies. OMB initially listed 16 agencies with 74 areas of vulnerability, and later issued an additional list of 14 of the smaller agencies having 28 areas of vulnerability. GAO selected its list of vulnerable areas based on knowledge of the problem areas from previous work, the magnitude of the problem, the likelihood of achieving savings, and what additional work may be required.

Federal agencies are being made aware of the regulations with which they must comply. The JFMIP is using News Bulletins, JFMIP Forums, informal discussions with groups, and notifications of the availability of the GSA schedule to inform the agencies of the pertinent regulations. Oversight reviews of financial systems under the Financial Integrity Act help enforce compliance with the regulations. Also, JFMIP has said that because the core requirements are general and nonspecific, the agencies appear to be cooperating.

The objective of the overall improvement plan for financial systems is to install a core financial system in each agency that uses commercial software. The core financial system makes all standard budget and financial reports to OMB, to the Treasury Department, and to Congress; accounts for assets and liabilities; and provides for overall funds control. The number of these core or primary financial systems has been reduced from 359 in 1985 to approximately 200 in 1990.

Changes to payroll/personnel systems have been extensive in recent years as the agencies produced dramatic results in response to government regulations. In 1983 OMB established a policy that major agencies should operate no more than one payroll and personnel system each, with five systems allowed for the Department of Defense. OMB also stated that smaller agencies, with fewer than 6,000 full-time employees, should arrange for processing services with other agencies. As a result of this regulation, the agencies have reduced the number of their payroll/personnel systems from 132 in 1983 to approximately 20 in 1990. This strategy has resulted in less systems development time, reduced maintenance and operating costs, and allowed funding to be devoted to the acquisition of newer technology.

The federal regulations and requirements pertaining to financial systems exist and are recognized by the agencies. The JFMIP core requirements are being followed because they are very general, and because JFMIP is providing guidance and assistance to the agencies. Problems still remain, however, in the agencies' complete compliance with the Financial Managers Financial Integrity Act regulations because there is no mechanism for ensuring compliance. Agency budget constraints also inhibit compliance, thus hampering vendors from increasing market penetration.

D
Impediments to Vendors

There appear to be very few companies in the market now. The same reasons apply to most federal information technology markets. Exhibit III-6 lists the perceived impediments to entrance in the market.

First, a substantial investment is involved in developing core-compliant software. The large investment reflects the unique nature of the government's accounting requirements. There are several integrated functions needed to support each agency's financial management office. As an example, the Department of Commerce bought the CDSI FARS software (one of the three systems available on the GSA schedule) before the GSA schedule was established. Approximately 10,000 lines of code out of a total of 500,000 lines had to be rewritten by CDSI.

Commerce has recently released a Request For Information for off-the-shelf accounting software that complies with the JFMIP core requirements. The announcement states that the software "should meet the federal accounting requirements without extensive modification for other

than unique programs." But this requirement by Commerce seems to be contradictory because there are not enough federal financial system regulations to govern accounting software requirements.

The second reason that there are few vendors in the market now is that most vendors believe that the federal financial systems market is limited. It is true that there are a limited number of federal agencies, and there are not very many systems in the entire federal government. However, there is a lucrative after-market in the subagencies. Each agency's subagencies will require software and support services to match the parent agency's software. Thus the market is not quite as limited as some vendors believe.

Finally, many vendors chose not to enter this market because the market requirements are unique. The federal government's accounting and financial system standards differ from those in the commercial world. Therefore many vendors do not have the knowledge or skill to develop federal financial software.

EXHIBIT III-6

Perceived Impediments to Entrance in the Market

- Substantial investment required to develop software
- Limited market
- Unique requirements

The agencies were surveyed on the evaluation criteria they would use in the selection of a financial systems software vendor. The agency respondents indicated that the most important criterion was compliance with JFMIP standards. The second highest rated criterion was software development experience, which tied with availability of software products. Thus the agencies realize that core-compliant software is essential, but there is also a need for customization of the commercial off-the-shelf software. This finding is important to vendors who must justify the initial software investments. Exhibit III-7 lists the evaluation criteria that would be used in the selection of financial systems software.

EXHIBIT III-7

Evaluation Criteria for Selection of Financial Systems Software

Criterion	Rating
• Compliance with JFMIP standards	4.2
• Software development experience	3.4
• Software products	3.4
• Vendor experience with federal financial systems	3.1
• Available hardware environment	3.0

(1 = important, 5 = not important)

Other criteria were mentioned by the agency respondents as well. These criteria were rated lower, but the ratings indicate that they are still relevant to the selection of financial software. Vendor experience with federal financial systems was mentioned prominently by the respondents. The respondents did not rate the available hardware environment very high. Most of the respondents stated that they currently use IBM mainframes and PCs; other types of hardware mentioned include Amdahl and Honeywell.

E
Budget Constraints and Software Procurement Alternatives

All of the agencies surveyed for this report stated that budget constraints were an important factor in the acquisition of financial software. The software itself may not be prohibitively expensive, but the customization required causes the cost of the system to rise above what many small agencies can afford. Discretionary funding is a rare commodity in the federal government, so the opportunities for acquisition of financial software are limited. Fortunately the administration's recognition of the importance of compliant financial software is growing. Financial software is now seen by the administration as an item of necessity. At this time, however, funds for acquisition are still limited.

The JFMIP Core Requirements have also been used as a criterion for establishing a GSA award schedule. In September 1988 the GSA schedule for commercial off-the-shelf accounting software was established. To date, only three companies have their financial software accepted for the schedule. These companies are AMS, CDSI, and KPMG Peat Marwick. Agencies can also acquire technical support services from the companies on the GSA schedule.

Although the GSA schedule was designed to make compliant software easily available at low cost to the government, the software has not met agency expectations. The agency respondents have almost unanimously stated that a substantial amount of customization was required for the core-compliant software they acquired.

The core-compliant software currently offered on the GSA schedule does require extensive modifications because the core requirements are simply an umbrella and cannot cover all agencies' needs. The financial system requirements increasingly deviate from standard software packages as the agencies move into proprietary program areas. As more financial systems standards are developed for governmentwide use, however, the agencies will be able to request more-complete software from the vendors on the schedule.

The Social Security Administration terminated its current contract for upgrading its financial management software in May, 1990. Arthur Andersen was upgrading the agency's financial management system using AMS' Federal Financial System (FFS). According to sources, however, FFS delivered only about two-thirds of SSA's requirements, and further customization was required. SSA became concerned when the estimated costs required to modify the commercial package nearly tripled. SSA will retain its license for the FFS package and will likely award a maintenance contract to AMS through the GSA schedule. This contract is an example of what can go wrong because of the great amount of customization required. The lack of government-wide financial system requirements allows the agencies leeway, but it prevents any software vendors from developing a comprehensive package that meets all government agency needs.

Some agencies have actually developed and upgraded their systems in-house. These systems are clear and understandable to the internal users. However, these internally developed systems do not communicate well with other systems, and they do not easily interface with vendor software.

Smaller agencies with very limited information technology budgets may find the cost of commercial software prohibitive. Four alternatives exist for the acquisition of core-compliant commercial software, as indicated in Exhibit III-8.

EXHIBIT III-8

Alternatives to Purchasing
Core-Compliant Software

- Cross-servicing

- Combination of cross-servicing and purchasing core-compliant software

- Personal-computer accounting packages

- Exemption from the core requirements

One alternative is cross-servicing, which permits better quality service at reduced cost, and serves to eliminate or consolidate systems. Cross-servicing capabilities were expanded by a President's Council on Management Improvement project that was completed in 1988. This project identified the core requirements for the Governmentwide Model Personnel/Payroll System. The project's Model System requirements are being adapted by the JFMIP and will be published as mandatory in the future. JFMIP is encouraging the use of cross-servicing as a means to consolidate payroll/personnel systems. Cross-servicing is currently available through the Department of Agriculture's National Finance Center, GSA, and the Department of Health and Human Services at the Parklawn Building. Plans are underway to offer cross-servicing at the Department of the Interior and the Department of Veterans Affairs.

The Library of Congress is converting its payroll/personnel system to that of the National Finance Center. The Library expects to be fully converted by July 1, 1990. The Library expects to achieve savings of approximately $782,000 to $1.3 million over 5 years.

Another alternative that is less widely used but is still effective is the combination of procuring core-compliant software and cross-servicing arrangements. The Financial Management Service has purchased two off-the-shelf accounting systems through the GSA schedule and is making the systems available to small agencies on a cross-servicing basis. Fewer than ten agencies are currently using this alternative, but it may represent an important source of future sales to smaller agencies.

Federal agencies with accounting needs that resemble those of a small business can adopt software originally developed for small businesses. There are many personal-computer accounting packages that can be adapted to meet the needs of federal agencies. Most of the packages are developed for IBM/PC-DOS systems and include spreadsheet and data base designs.

These systems are best adopted by regional and overseas government locations. These locations give low priority to automated financial management systems; PC-based financial packages could easily meet their needs. For example, the Department of Agriculture has 44 subagencies and 15,000 sites. Not all of these sites have access to or enough funding to buy financial software from department-wide contracts, so vendors with PC-based packages could sell software to these sites.

There are many financial software products on the market right now that cost less than $1,000. These products usually provide four closely integrated modules: general ledger, accounts receivable, accounts payable, and payroll. These are the four main modules that remote sites would require.

The potential market for these products is very large because there is a multitude of regional and overseas federal offices. Vendors can increase revenues in this market because all of the systems sold will also require extensive support, including installation and consulting.

The final alternative to purchasing off-the-shelf software is obtaining an exemption from the core requirements. An example is at the Food and Nutrition Service at the Department of Agriculture. The Food and Nutrition Service has a large financial system outside the core, and the core area is small. This agency was able to obtain an exemption since its needs for core compliance were very limited. The software was acquired through competition.

Agencies have many options for acquiring core-compliant financial software. Because the agencies have so many different methods of acquiring their software, it is doubtful that a single approach meets all agency needs. Software vendors need to provide customization services to fulfill the needs of each agency. In time, JFMIP may be able to develop all the requirements needed for a single, governmentwide financial system. But currently there is not enough detail in the financial software system requirements to guide software vendors in developing a commercial software package that can do everything.

F
Procurement Opportunities

The best opportunity for software vendors to sell to agencies is through the GSA schedule. Most agencies that need financial software look to the schedule first to see what is available. There are also opportunities for hardware vendors and services vendors. The agencies that require maintenance for their financial software can obtain it from the vendors already on the GSA schedule. Thus that portion of the market is very competitive on price. Hardware firms will mainly find indirect opportunities in this market. Federal agencies will acquire hardware that can run core-compliant financial software as well as take care of other processing

requirements. The impact of the market on hardware firms is discussed in another section of this report. The following opportunities show the divergence of the federal market for financial systems:

1. As pointed out above, the Department of Commerce has released a Request For Information (RFI) for off-the-shelf accounting software that is core-compliant. Commerce currently uses CDSI's Financial Accounting and Reporting System (FARS). FARS has been used in Commerce for nearly 2 years, but it does not satisfy all of the department's requirements. An analysis by Andersen Consulting found that FARS does not comply with Standard General Ledger (SGL) requirements.

2. The Office of Personnel Management is currently considering a proposal to acquire financial software through the GSA schedule. AMS, CDSI, and KPMG Peat Marwick have submitted proposals to OPM for this procurement.

    Throughout the government are other financial systems that at some time or another will need replacement or augmentation. The remainder of Section F provides a short discussion on some of those systems and when solicitations may be released.

3. The Air Force Command Budget Automated System (CBAS) is an on-line timesharing system that processes and tracks budget formulations data at all levels of the Air Force. CBAS uses Sperry hardware acquired in 1981, along with Sperry Mapper software. The Air Force also developed software in-house to keep the system up-to-date. A competitive solicitation may occur within two years to update the software used for CBAS.

4. Air Force BLARS (Base Level Accounting and Reporting System) was cancelled recently in favor of the Army's Standard Financial System Redesign (STANFINS - R). The cancellation occurred because of the Corporate Information Management initiative to eliminate redundant administrative ADP systems. STANFINS - R is under redevelopment by the Army and Computer Sciences Corporation, using Ada software. The actual number of the Defense Department's accounting procedures that would be included in the new system is still under debate.

    BLARS was termed by a recent GAO report as unable to provide complete and reliable financial data. According to the report, information produced by the system is not timely, is unauditable, and in many cases is incorrect. A spokesman for Senate Committee on Governmental Affairs chairman John Glenn questions whether the new system will actually ever be done. The spokesman said that servicewide systems are often planned but nothing ever happens. If

this is true, then both the Air Force and the Navy will be forced to go out on their own again to procure a new financial system.

5. The Internal Revenue Service will likely recompete the contract for the Budget Preparation System after 1993. The Budget Preparation System prepares the IRS annual budget and contains the current and past budgets in a computerized data base. The system is currently managed through a timesharing contract with Boeing Computer Services. Creation of an in-house system for after 1993 is under consideration.

6. The Financial Management Service System 90 contract is due to be awarded in the third quarter of fiscal year 1990. System 90 will overhaul and modernize the Regional Finance Centers' systems. System 90 will be the central accounting and reporting system. It is responsible for the U.S. Government's cash management program, payments and collections, and investments of Social Security and other trust funds.

7. The Department of Education Office of Management has a system called Management Information Data Control and Accounting System (MIDAS). MIDAS controls funds and maintains accounting records of appropriations, allotments, limitations, obligations, payments, expenditures, receivables, and collections. A contract was awarded to Computer Management Information Systems (CMIS) for accounting software and support services. This contract will be recompeted in 1993.

To the extent that agencies perceive weaknesses in their computer systems, opportunities exist for vendors to improve these systems. For example, recent audits by the GAO and the Agriculture Department Inspector General show major weaknesses in Agriculture's National Finance Center (NFC). In particular, NFC's financial management systems lack strong internal controls. The lack of internal controls could lead to the fraudulent of use of funds and/or the loss of other agencies' financial activity currently running at NFC.

The GAO recently identified problems at the Air Force, HUD, IRS, the Postal Service, and Customs Service. The problems provoked Senator John Glenn to introduce new legislation that would mandate increased uniformity of financial systems throughout the government. If this proposal becomes law, many agencies will need contractual assistance to modify and standardize their systems.

The GAO also criticized the Treasury Department for failing to verify that account interest payments equal actual payments. As of December, 1988, 18 account balances, totaling more than $53 billion, had not been reconciled. To some extent, vendors may be able to assist Treasury's

Bureau of Public Debt in resolving the problems. The Federal Reserve Bank of Cleveland is developing the Public Debt Accounting and Reporting System, which will help to prevent future problems. However, the past problems still need to be resolved.

G

Market Forecast

The federal financial systems market is expected to grow from $95 million in FY1990 to $146 million in FY1995, at a compound annual growth rate (CAGR) of 9%. As shown in Exhibit III-9, INPUT divided the market into three categories:

- Computer equipment
- Software products
- Professional services

Each of these categories is a subset of INPUT's overall market categories and does not represent additional agency spending.

EXHIBIT III-9

Federal Financial Systems Market Forecast
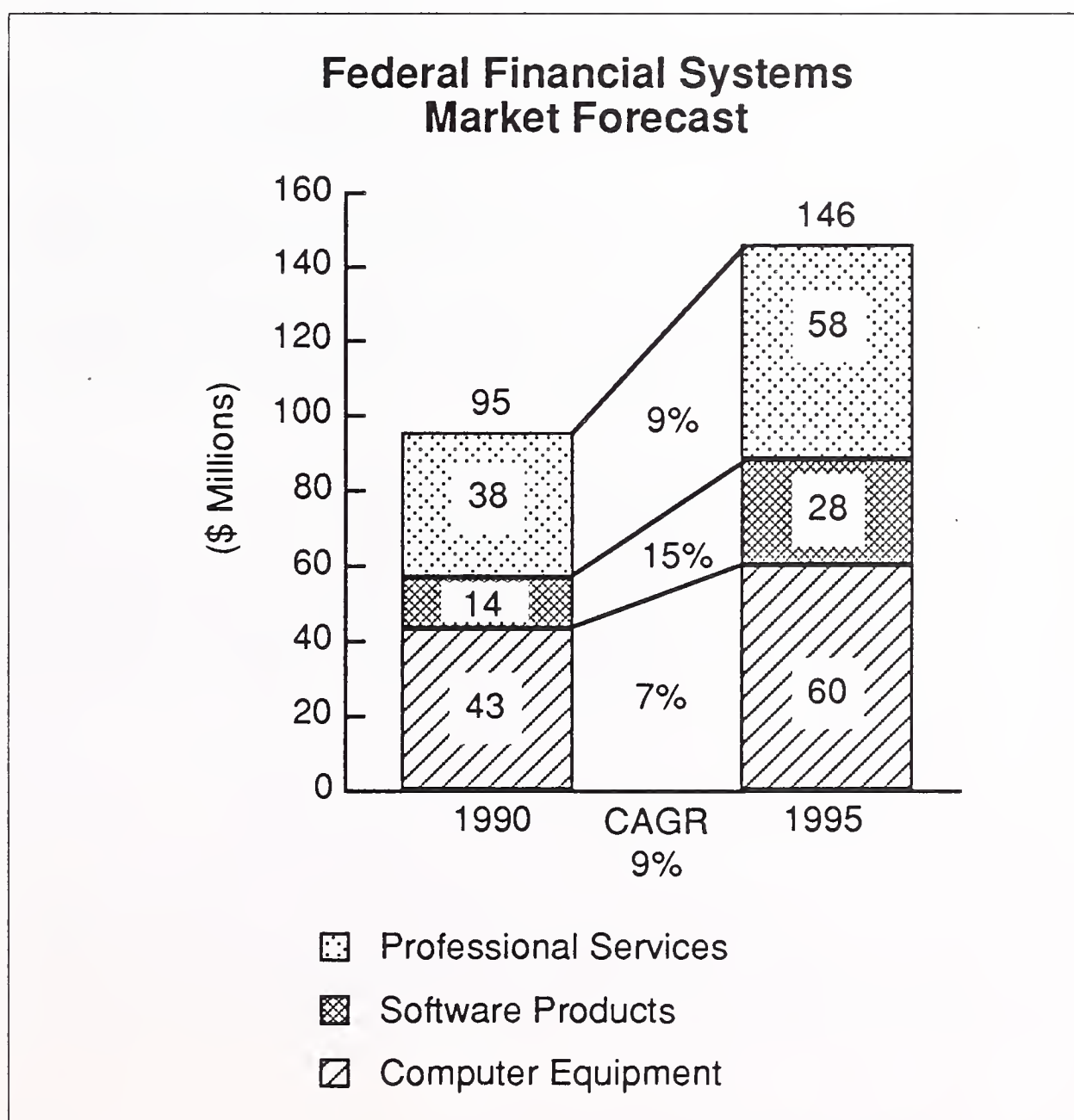
As noted in the exhibit, software products should show the fastest growth rate (15%) as more products become certified as JFMIP core compliant. However, associated professional services, particularly software development, will continue to account for a much larger share of the market. This large share reflects a continuing demand for tailoring of the software products to meet agency-specific needs. The software products themselves will be under continuing competitive pressure, thus holding down prices.

On the hardware side, INPUT expects midsize systems to account for the bulk of the sales, although microcomputers dedicated primarily to financial systems will likely also increase.

H
Conclusions and Recommendations

The federal financial systems market is relatively young. Until recently there have not been significant attempts by the government to regulate federal financial systems, but JFMIP's efforts have changed that situation. The market is seemingly limited, but it does actually show some growth potential. The market is limited by the relatively small number of federal agencies and by the high cost of entry into the market. However, the large number of subagencies in the government constitute greater opportunities than are perceived by most vendors.

Vendors interested in entering the market should contact the JFMIP for assistance. They should also remain in close association with the agencies themselves. Agency financial officers must be consulted to determine their future requirements, and information systems officials need to be conferred with to determine when and how the procurements might take place.

Vendors also must be prepared to offer custom programming and assistance in addition to the software itself. Modifications to the software are a significant contribution to the total price of a financial system because each agency requires different adaptations. Extensive custom programming will remain necessary until the JFMIP releases more distinct and binding requirements for financial software systems.

IV
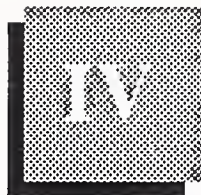
Competitive Considerations

This chapter discusses vendor involvement with the federal financial
systems market.

A
Current Software Vendors

The three companies listed in Exhibit IV-1 have software that is approved
for the GSA financial systems software schedule. Several other vendors
may soon be approved for the schedule, including Management Science
America (MSA), Oracle, and Ernst & Young. JFMIP is working with
more software vendors to have their software approved for the schedule.
JFMIP would like to see at least 5-6 vendors included on the schedule.

To date, American Management Systems (AMS) sold three financial
software packages through the GSA schedule. The Treasury
Department's Financial Management Service is a cross-servicing licensee

EXHIBIT IV-1

GSA Financial Software
Schedule Vendors

- American Management Systems

- Computer Data Systems Inc.

- KPMG Peat Marwick

and has installed AMS' Federal Financial System (FFS) at three agencies,
with two more committed to use the system. The Internal Revenue
Service and the Department of Veterans Affairs have also purchased FFS
through the GSA schedule.

Several agencies purchased the AMS software prior to the formation of the GSA schedule. These agencies include:

- Railroad Retirement Board
- GAO
- EPA
- Commodity Futures Trading Commission
- Department of State
- Securities and Exchanges Commission
- Comptroller of the Army
- Comptroller of the Navy
- Administrative Office of the U.S. Courts
- Boeing Petroleum Services (a prime contractor for the Department of Energy)

Also, the Department of Interior has purchased the AMS software for the entire department. It is currently in operation at the U.S. Geological Survey, Bureau of Reclamation, Fish & Wildlife Service, and the Bureau of Mines. The software will go into operation at the other four agencies within Interior in October 1990.

Computer Data Systems Incorporated (CDSI) has not been nearly as successful as AMS in selling its financial software to the government. CDSI has not received any orders through the GSA schedule for its Federal Accounting and Reporting Software (FARS). FARS is currently installed at the Department of Commerce, but Commerce has issued an RFI for alternatives to FARS. CDSI has also installed FARS at:

- Public Health Service (PHS)
- Department of Agriculture
- Bureau of Public Debt (Department of Treasury)
- Library of Congress

CDSI is waiting for GSA approval on options and enhancements to FARS. These enhancements would include new modules and improvements to FARS and would allow FARS to be used on microcomputers as well as mainframes and thus be more appealing to agency prospects. CDSI has been waiting for about a year for GSA to approve the changes.

KPMG Peat Marwick is the most recent addition to the GSA financial software schedule. Peat Marwick has not yet received any orders through the schedule for its Federal Financial Accounting Management Information System (FAMIS) software. However, Federal FAMIS is currently installed at:

- Soil Conservation Service (USDA)
- Agricultural Stabilization and Conservation Service (USDA)

Older versions of FAMIS are currently in place at:

- U.S. Customs Service
- ACTION
- Consumer Product Safety Commission
- Peace Corps
- Bureau of Alcohol, Tobacco, and Firearms
- National Highway Traffic Safety Commission

B
Future Software Vendors

JFMIP is encouraging more software vendors to enter the federal financial systems market. JFMIP is, as stated previously, working with vendors and GSA to expand the GSA schedule. The accounting firms currently working in federal agencies are becoming aware of the market's potential, so more of them may choose to enter the market. JFMIP is also using personal persuasion, through conference and individual contacts, to convince software vendors to develop core-compliant software.

To encourage the participation of more firms, JFMIP will aid firms that want to enter the federal financial systems market. Vendors can provide documentation to JFMIP for evaluation of their compliance with the core requirements. But JFMIP does not actually test the software because of the variability of the test schedule. The agencies themselves must test the software because they are the only ones who truly understand the requirements. Software firms with core-compliant software must be prepared to provide additional software development services. These services are needed to customize the software for each agency's needs.

There are other software firms not currently on the GSA schedule that may be significant future players. These firms were mentioned by the agency questionnaire respondents as leading financial software vendors. Management Science America (MSA), Oracle, and Ernst & Young have all developed or are developing suitable software for the agencies to use in accounting or reporting.

The costs of entering this market can be high. A substantial investment is involved in developing JFMIP core-compliant software. The accounting and reporting requirements used by the government are not similar to those used in the commercial sector. Vendors interested in entering the market also must be prepared to invest a lot of time modifying software code. Also, each agency has its own internal requirements that require software modification. Thus even after financial software meets the JFMIP core requirements, additional time must be invested to meet agency requirements. However, this agency tailoring may be highly profitable to the vendors.

INPUT expects still other software vendors to enter the federal market financial systems. Exhibit IV-2 lists the key vendors for IBM and Digital

mid-size platforms. Given the federal market penetration of these two hardware vendors, the software vendors will likely find the opportunity irresistible.

EXHIBIT IV-2

Leading Commercial Financial Software Vendors

- Digital: VAX

  - Ross Systems, Inc.: Renaissance general ledger

  - MCBA, Inc.: MCBA Classic

  - Ask Computer Systems: Manman/GL

  - Collier-Jackson (Compuserve): World Class Series

  - Computer Associates: CA-general ledger

- IBM: AS/400, System/34,36,38

  - J.D. Edwards and Company: JDE general ledger

  - Software Systems Associates, Inc.: BPCS general ledger

  - IBM: Various packages

  - Computer Associates: CA-general ledger

  - Lawson Associates, Inc.: Pinstripe general ledger

C

Impact on Hardware Vendors

There is certainly no regulation of firms that can enter this market. To be able to penetrate the federal financial systems market, a vendor must obviously offer JFMIP core-compliant software. Initially, all approved systems ran on IBM platforms. Hardware firms that wish to market their machines for financial systems need to align themselves with approved financial-software vendors.

For example, AMS recently announced a Unisys version of its FFS software. The FFS now runs on Unisys 1100/2200 systems. The great number of Unisys systems in the government spurred the demand for the new version of the software. Many government users wanted a Unisys version of FFS because they did not anticipate changing their hardware platforms. This indicates that budget constraints will not allow much purchasing of mainframe systems. Also, for hardware vendors to keep their current government clients, they must be able to support core-compliant financial software.

Hardware vendors, like Unisys, need to enter into cooperative marketing agreements with software vendors. Under these agreements, the software vendors should develop core-compliant software for the necessary platforms. This is the strategy used by Unisys and a few other hardware vendors that are aggressive in the financial systems market.

If hardware vendors do not align themselves or otherwise manage to have compliant software developed on their systems, then they will be shut out of the financial systems market. The JFMIP core requirements are driving this market and the agencies are complying.
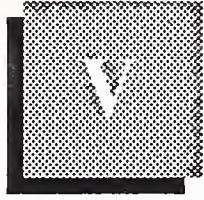
Key Opportunities

This chapter describes specific opportunities in the federal financial systems market. A list of typical major programs for key agencies is provided. The list covers the period FY1990 to FY1995. Other new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of INPUT's Procurement Analysis Reports will include new programs and detailed program information for FY1990-FY1995.

A

Financial Systems Opportunities by Agency

Agency	Program	RFP Estimated Schedule	Est. Funding FY1990-FY1995 ($ million)
Agriculture	Integrated Financial Management Information System (IFMIS)	5/5/90	UNK
Air Force	Command Budget Automation System (CBAS)	FY1992	UNK
USDA	NFC Replacement	FY1991	UNK
Department of Defense	Consolidation Initiative	FY 1991	UNK
Commerce	FARS Replacement	FY1991	UNK

Agency	Program	RFP Estimated Schedule	Est. Funding FY1990-FY1995 ($ million)
Education	Management Information Data Control and Accounting System (MIDAS)	FY1993	12
Office of Personnel Management	Financial Software	FY1990	UNK
Treasury/IRS	Budget Preparation System	FY1993	UNK
Treasury/BPD	Expansion of Computer Processing Capacity	FY 1992	20.2
Treasury/IRS	Document Processing System	12/90	500
Treasury/IRS	Corporate Files On-line	1/91	95
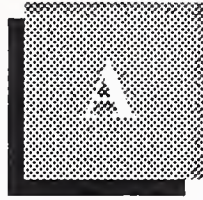
Appendix: Federal Financial Systems Interview Profiles

A

Federal Agency Respondent Profile

Contacts with agencies were made by mail, by telephone, and at agency sites. The following agencies were interviewed:

- Department of Commerce
- Federal Communications Commission
- Department of Health and Human Services
- Department of Interior
- Joint Financial Management Improvement Program
- Department of Justice
- Office of Management and Budget
- Securities and Exchanges Commission
- Department of Treasury

Interviews included program managers and agency policy officials.

B

Vendor Respondent Profile

Vendors were not interviewed for this report.
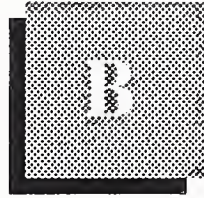
Appendix: Federal Financial System Documents

These documents were used in the research and writing of this report and may be valuable to vendors interested in penetrating the market.

The Proceedings of the 19th Annual Financial Management Conference - March 5, 1990

JFMIP Core Financial System Requirements - January 1988

JFMIP News (Quarterly Bulletin)

JFMIP 1988 Report on Financial Management Improvements

JFMIP 1987 Report on Financial Management Improvements

GAO Testimony - Financial Audit: Air Force Does Not Effectively Account for Billions of Dollars of Resources - Statement of Charles Bowsher, Comptroller General - March 1990 - Publication GAO/T-AFMD-90-11

GAO Testimony - Federal Internal Control and Financial Management Systems: Major Reform Efforts Are Needed - Statement of Donald H. Chapin, Assistant Comptroller General - April 1990 - Publication GAO/T-AFMD-90-14

GAO Policy and Procedures Manual for Guidance of Federal Agencies - Title 2, November 1984

Federal Agency Responses to OMB Circular A-11, Sections 43A and 43B, for FY1991

Federal Agency Long Range Information Resource Management Plans
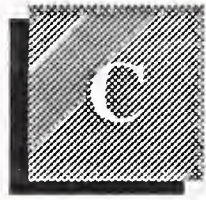
Appendix: Definitions

The definitions in this appendix include hardware, software, services, and telecommunications categories to accommodate the range of information systems and services programs described in this report.

Alternate service mode terminology employed by the federal government in its procurement process is defined along with INPUT's regular terms of reference, as shown in Exhibit B-1.

The federal government's unique nontechnical terminology that is associated with applications, documentation, budgets, authorization, and the procurement/acquisition process is included in Appendix C, Glossary of Acronyms.

A

Delivery Modes

Processing services - This category includes transaction processing, utility processing, other processing services, and processing facilities management.

- *Transaction Processing Services* - Updates client-owned data files by entry of specific business activity, such as sales order, inventory receipt, cash disbursement, etc. Transactions may be entered in one of three modes.

  - *Interactive* - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program files. Computer response is usually measured in seconds or fractions of a second.

  - *Remote Batch* - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.

EXHIBIT C-1

FEDERAL INFORMATION SYSTEMS AND SERVICES PROGRAM
INFORMATION SERVICES INDUSTRY STRUCTURE
1989

Information Services Industry

Processing Services
- Network Services
  - Network Services
    - VANs
    - EDI
    - Electronic Mail
    - Other
  - Electronic Info. Services
    - Data Bases
    - News
    - Videotex
    - Other
  - Processing Services
    - Transaction Services
    - Utility Services
    - Other Services
  - Systems Operations (Vendor-Owned Equip.)

Turnkey Systems
- Equipment
  - Workstation/PC
  - Midsize Computer
  - Mainframe
- Packaged Software
- Customized Software
- Support

Software Products
- Applications Software
  - Workstation/PC
  - Midsize Computer
  - Mainframe
- Systems Software
  - Systems Control
    - Workstation/PC
    - Midsize Computer
    - Mainframe
  - Data Center Management
    - Workstation/PC
    - Midsize Computer
    - Mainframe
  - Applications Dev. Tools
    - Workstation/PC
    - Midsize Computer
    - Mainframe

Systems Integration
- Equipment
- Packaged Software
- Custom Software
- Professional Svcs. (SI Related)

Professional Services
- Consulting
- Education & Training
- Software Development
- Systems Operations (Client-Owned Equip.)

Industry-Specific Sectors (15)

Cross-Industry Sectors (7)

FIFIN

- *User Site Hardware Services (USHS)* - Those offerings provided by processing services vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

° Access to a communications network

° Access through the network to the RCS vendor's larger computers

° Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network

° Significant software as part of the service

• *Utility Processing* - Vendor provides access to basic software tools enabling the users to develop their own problem solutions such as language compilers assemblers, DBMS, sorts scientific library routines, and other systems software.

"Other" Processing Services include:

• *Batch Services* - These include data processing at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing. Other services also includes disaster recovery and backup services.

• *Systems Operations (Processing)* - Also referred to as "Resource Management," Facilities Management or "COCO" (contractor-owned, contractor-operated). Systems control is the management of all or part of a user's data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify, the contractor must directly plan, control, operate, and own the facility provided to the user–either on-site, through communications lines, or in a mixed mode.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category.

Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specific applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.

Network Services include a wide variety of network-based functions and operations. The common thread is that more of these functions could be performed without network involvement. Network services is divided into two segments: value-added networks (enhanced services), and network applications (electronic information systems).

• *Value-Added Networks (VANs)* - VANs typically involve common carrier network transmission facilities that are augmented with computerized switches. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

• *Network applications* include electronic data interchange (EDI), the application-to-application electronic communications between organizations, based on established business document standards and electronic mail.

Software products - This category includes user purchases of applications and systems software packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, as indicated below and shown in detail in Exhibit B-2.

EXHIBIT C-2

SOFTWARE PRODUCTS

Systems Software

Systems Control

- Access Control
- Communications Monitors
- Encryption Systems
- Operating Systems
- Point-to-Point Control
- System Library Control
- Other

Data Center Management

- Capacity Management
- Computer Operations Scheduling
- Data Center Management
- Downtime/Repair Monitoring Management
- Job Accounting
- Performance Monitors
- Tape Management
- Utilities
- Other

Data Base Management Systems

- Data Base Management Systems
- Data Dictionaries
- Other

Applications Development

Program Development and Production Tools

- Application Generators
- Assemblers
- Automatic Documentation
- Compilers
- Debugging Aids
- Languages
- Project Control and Management Systems
- Retrieval Systems
- Spreadsheet Systems
- Translators
- Others

EXHIBIT C-2 (Cont.)

SOFTWARE PRODUCTS (Cont.)

Applications Software

Cross Industry

Accounting
- Accounts Payable
- Accounts Receivable
- Fixed Assets
- General Ledger
- Purchasing
- Other

Human Resources
- Benefits
- Payroll
- Personnel
- Training and Education
- Other

Information Analysis
- Budgeting
- Decision Support Systems
- Financial Planning
- Forecasting
- Modeling
- Other

Logistics Distribution
- Distribution Accounting
- Inventory
- Invoicing/Billing
- Mailing List
- Order Entry
- Procurement
- Other

Word Processing
- Document Generators
- Text Editors
- Word Processing
- Others

Graphics
- Character Graphics
- Line Graphics
- Picture Graphics
- Others

Other
- Administrative Services
- Executive Services
- Operations Services
- Project Control and Planning
- Scientific Engineering and Technical Support
- Other

Industry-Specific
- Education
- Federal Government
- Insurance
- Medical
- Process Manufacturing
- Services
- State and Local Government
- Transportation
- Utilities
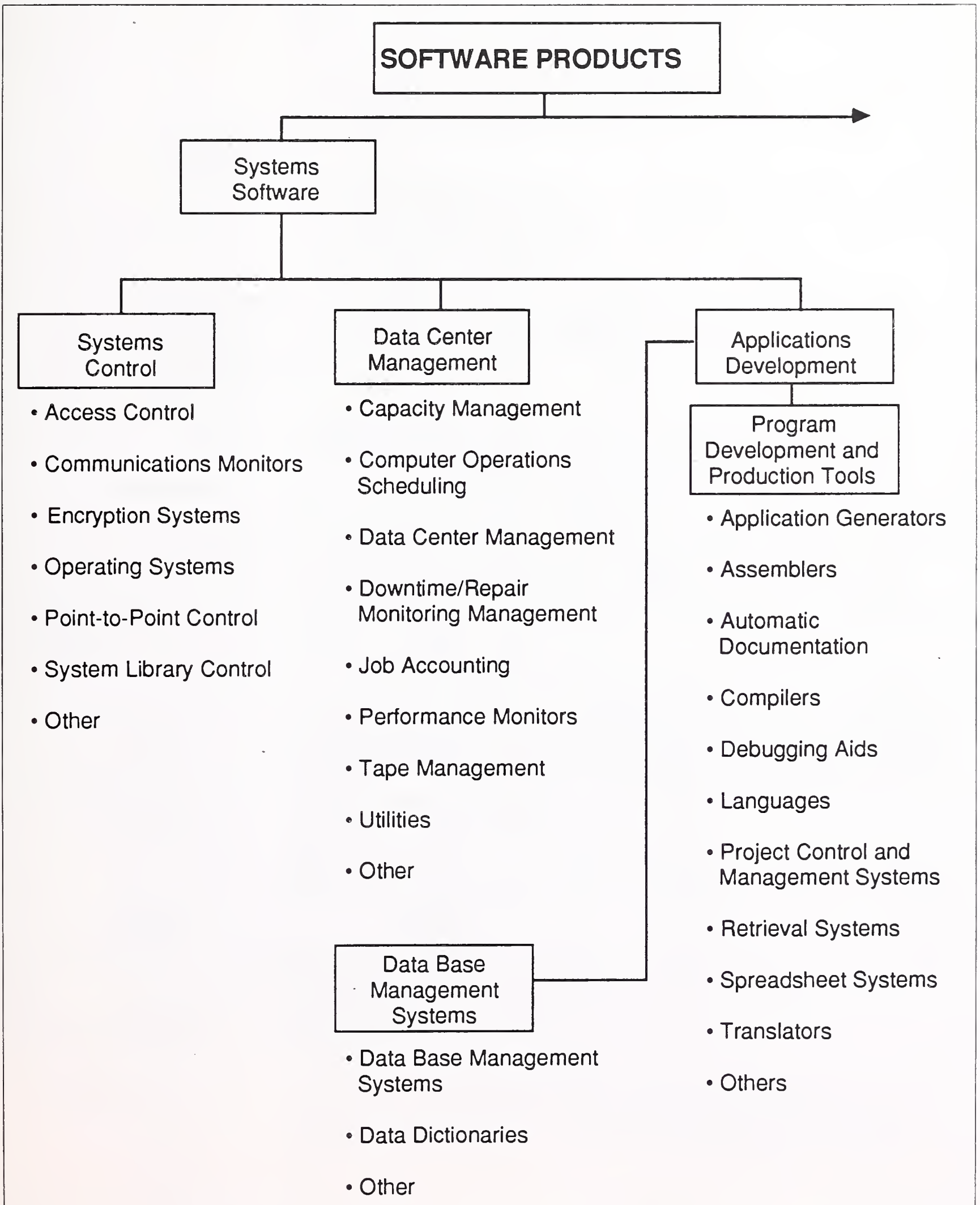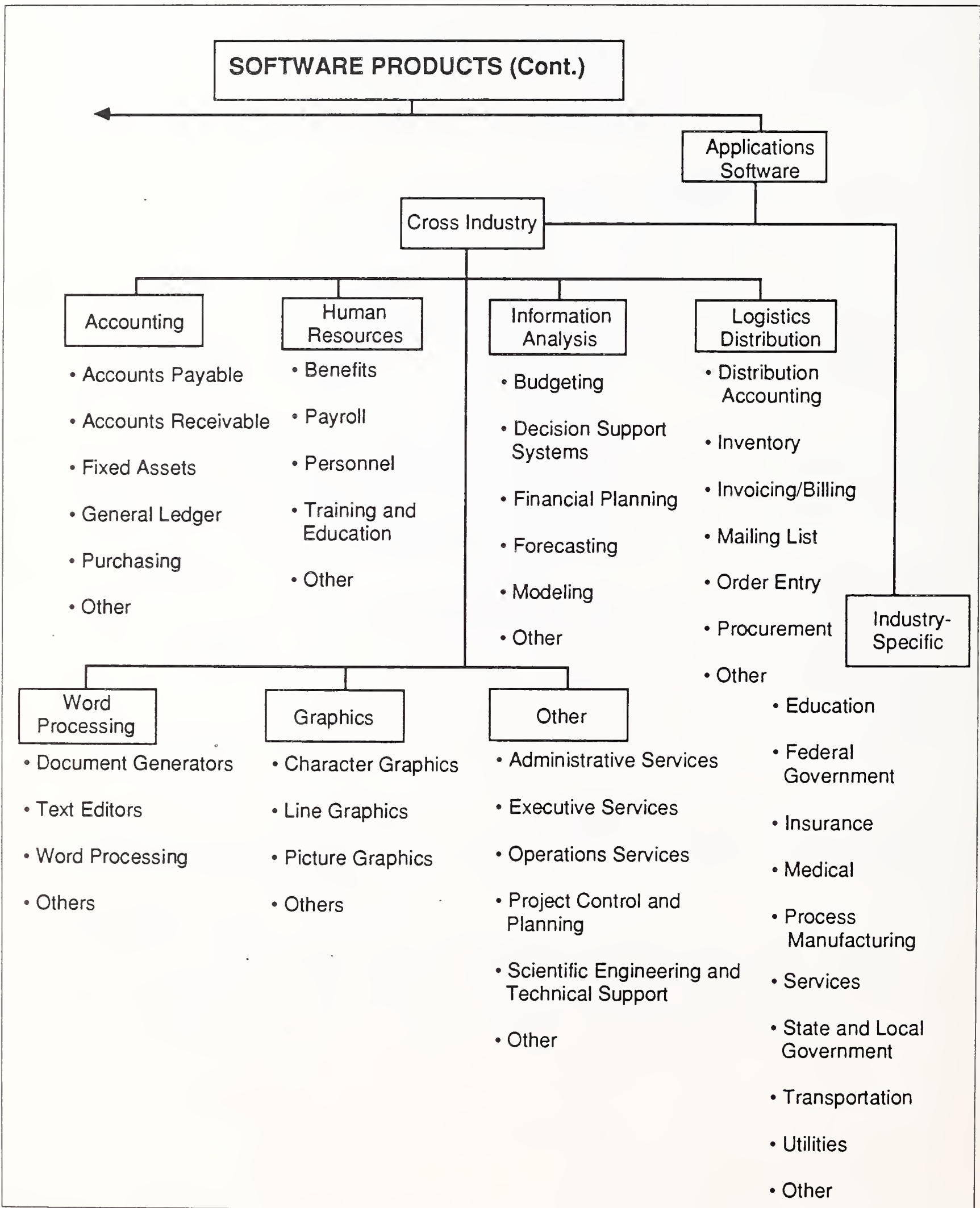- Other

- *Applications Products* - Software that performs functions directly related to solving user's business or organizational need. The products can be:

  - *Cross-Industry Products* - Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.

  - *Industry-Specific Products* - Used in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and material resource planning.

- *Systems Software Products* - Software that enables the computer/ communications system to perform basic functions. These products include:

  - *System Control Products* - Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, spoolers, network control, library control, windowing, access control.

  - *Data Center Management Products* - Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, utilities, capacity management.

  - *Applications Development Products* - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include traditional programming languages, 4GLs, sorts, productivity aids, assemblers, compilers, data dictionaries, data base management systems, report writers, project control, and CASE systems.

Professional Services - This category includes consulting, education and training, software development, and systems operations as defined below.

- *Software development* - Develops a software system on a custom basis. It includes one or more of the following: user requirements definition, system design, contract programming, documentation, and software maintenance.

- *Education and Training* - Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

- *Consulting Services* - Information systems and/or services management consulting, project assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Systems Operations (Professional Services)* - This is a counterpart to systems operations (processing services) except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

Turnkey Systems - A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single application (or set of applications) solution. The value added by the vendor is primarily in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems may be either custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

- Turnkey systems revenue is divided into two categories:

  - *Industry-specific systems* - that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.

  - *Cross-industry systems* - that is, systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, or personnel management systems.

- Revenue includes hardware, software, and support functions.

Systems Integration: (SI) delivery of large, complex multidisciplinary, multivendor systems, incorporating some or all of these categories: systems design, programming, integration, equipment, packaged software, communication networks, installation education and training, and SI-related professional services and acceptance. Systems integration contracts typically take more than a year to complete and involve a prime contractor assuming risk and accepting full responsibility.

B

Hardware/Hardware Systems

Hardware - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor, and generally cannot be included in other categories such as terminals.

- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

- *Communication Devices* - Includes modems, encryption equipment, special interfaces, and error control.

- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

Terminals - Three types of terminals are described below:

- *User-Programmable* - Also called intelligent terminals, including:

  - Single-station or standalone
  - Multistation shared processor
  - Teleprinter
  - Remote batch

- *User Nonprogrammable*

  - Single-station
  - Multistation shared processor
  - Teleprinter

- *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

Hardware Systems - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique

operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in the form of:

  - Integrated circuit package

  - Plug-in boards with more memory and peripheral circuits

  - Console including keyboard and interfacing connectors

  - Personal computer with at least one external storage device directly addressable by the CPU

  - An embedded computer which may take a number of shapes or configurations

  Microcomputers are primarily single-user computers that cost under $15,000.

- *Midsize Computer* - Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer. Specific systems in this category are: IBM 93XX systems, all Digital VAX series systems, and such common UNIX-based systems as from Apollo and Sun) are also included. Most large shared-logic, integrated office systems—such as those from Wang, Hewlett-Packard, and Groupe Bull—would also be considered midsize systems. Does not include microcomputers (standalone, or shared), embedded systems, and CAD/CAM systems.

- *Large Computer* - Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general-purpose, VonNeumann-type processors for system control. Usually refers to traditional mainframes (such as IBM 30XX, Unisys (Sperry) 1100/XX, Honeywell DDPS88, Unisys (Burroughs) A15, or CDC Cyber series) and supercomputers (such as products from Cray, ETA, Fujitsu, and the new IBM development effort).

- *Supercomputer* - High-powered processors with numerical processing throughput that is significantly greater than the fastest general-purpose computers, with capacities in the 100-500 million floating point opera-

tions per second (MFLOPS) range. Newer supercomputers, with burst modes over 500 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class, are labeled Class IV to Class VII in agency long-range plans. Supercomputers fit in one of two categories:

- *Real Time* - Generally used for signal processing in military applications.

- *Non-Real Time* - For scientific use in one of three configurations:

  ° Parallel processors
  ° Pipeline processor
  ° Vector processor

- *Supercomputer* - Term applied to micro, mini, and large mainframe computers with performance substantially higher than attainable by VonNeuman architectures.

• *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semi-permanent interfaces. May vary in capacity from microcomputers to parallel processors computer systems.

C

Telecommunications

Networks - Electronic interconnection between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

• *Common Carrier Network* - A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud.

• *Value-Added Network (VAN)* - (See listing under Section B, Delivery Modes.)

• *Local Area Network (LAN)* - Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods:

- *Baseband* - Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.

- *Broadband* - Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

  ° Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing)

  ° Multiple (time-sequenced) channels via TDM (Time Division Multiplexing)

  ° High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media)

• *Wide Area Network (WAN)* - Limited access network between computing resources in buildings, complexes of buildings, or buildings within a large metropolitan or wide geographical area. Uses baseband or broadband signaling methods.

Transmission Facilities - Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

• *Mode* - may be either:

  - *Analog* - Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.

  - *Digital* - Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.

• *Media* - May be any of the following:

  - *Wire* - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full-duplex balanced lines.

  - *Carrier* - A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communi-

cations system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* - A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- *Microwave* - UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- *Optical Fiber* - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications.

- *Communications Satellites* - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- *Cellular Radio* - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

D

| General Definitions | *103/113* - Bell standard modem for low-speed transmission up to 300 bps, asynchronous, half or full duplex. |

212 - Bell standard for medium-speed transmission at 1200 bps, asynchronous or synchronous, half or full duplex.

ASCII - American National Standards Code for Information Interchange—eight-bit code with seven data bits and one parity bit.

Asynchronous - Communications operation (such as transmission) without continuous timing signals. Synchronization is accomplished by appending signal elements to the data.

Bandwidth - Range of transmission frequencies that can be carried on a communications path; used as a measure of capacity.

Baud - Number of signal events (discrete conditions) per second. Typically used to measure modem or terminal transmission speed.

Benchmark - Method of testing proposed ADP system solutions for a specified set of functions (applications) employing simulated or real data inputs under simulated operating conditions.

BPS - Bits per second - also mbps and kbps, million bits per second and thousand bits per second, respectively.

BSC - IBM's binary synchronous communications data link protocol. First introduced in 1968 for use on point-to-point and multipoint communications channels. Frequently referenced as "bisync."

Byte - Usually equivalent to the storage required for one alphanumeric character (i.e., one letter or number).

CBX - Computerized Branch Exchange - a PABX based on a computer system, implying programmability and usually voice and data capabilities.

Central Processing Unit (CPU) - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions.

Centrex - Central office telephone services that permit local circuit switching without installation of customer premises equipment. Could be described as shared PBX service.

Circuit Switching - A process that, usually on demand, connects two or more network stations and permits exclusive circuit use until the connection is released; typical of the voice telephone network where a circuit is established between the caller and the called party.

CO - Central Office - local telco site for one or more exchanges.

CODEC - Coder/decoder, equivalent to modem for digital devices.

Constant Dollars - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.

Computer System - The combination of computing resources required to perform the designed functions and which may include one or more CPUs, machine room peripherals, storage systems, and/or applications software.

CPE - Customer Premises Equipment - DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company CO. May include switchboards, PBX, data terminals, and telephone answering devices.

CSMA/CD - Carrier Sense Multiple Access/Collision Detect. Contention protocol used in local-area networks, typically with a multi-point configuration.

Current Dollars - Estimates or values expressed in current-year dollars which, for forecasts, would include an allowance for inflation.

Data Encryption Standard (DES) - 56-bit key, one-way encryption algorithm adopted by NBS in 1977, implemented through hardware ("S-boxes") or software. Designed by IBM with NSA guidance.

Datagram - A self-contained packet of information with a finite length that does not depend on the contents of preceding or following packets.

DCA - IBM's Document Content Architecture - protocols for specifying document (text) format which are consistent across a variety of hardware and software systems within IBM's DISOSS.

DCE - Data Circuit-Terminating Equipment - interface hardware that couples DTE to a transmission circuit or channel by providing functions to establish, maintain, and terminate a connection, including signal conversion and coding.

DDCMP - Digital Data Communications Message Protocol - data link protocol used in Digital Equipment Company's DECNET.

DECNET - Digital Equipment Company's network architecture.

Dedicated Circuit - A permanently established network connection between two or more stations; contrast with switched circuit.

DEMS - Digital Electronic Message Service - nationwide common carrier digital networks which provide high-speed, end-to-end, two-way transmission of digitally-encoded information using the 10.6 GHz band.

DIA - IBM's Document Interchange Architecture - protocols for transfer of documents (text) between different hardware and software systems within IBM's DISOSS.

DISOSS - IBM's DIStributed Office Support System - office automation environment, based on DCA and DIA, which permits document (text) transfer between different hardware and software systems without requiring subsequent format or content revision.

Distributed Data Processing - The development of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's characteristics.

DTE - Data Terminal Equipment - hardware which is a data source or link or both, such as video display terminals that convert user information into data for transmission and reconvert data signals into user information.

EBCDIC - Extended Binary Coded Decimal Interchange Code - eight-bit code typically used in IBM mainframe environments.

EFT - Electronic funds transfer.

Encryption - Electrical, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points.

End User - One who is using a product or service to accomplish his or her own functions. The end user may buy a system from the hardware supplier(s) and do his or her own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.

Engineering Change Notice (ECN) - Product changes to improve the product after it has been released to production.

Engineering Change Order (ECO) - The follow-up to ECNs—they include parts and a bill of materials to effect the change in the hardware.

Equipment Operators - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).

Ethernet - Local area network developed by Xerox PARC using baseband signaling, CSMA/CD protocol, and coaxial cable to achieve a 10 mbps data rate.

Facsimile - Transmission and reception of data in graphic form, usually fixed images of documents, through scanning and conversion of a picture signal.

FDM - Frequency Division Multiplexing - a multiplexing method that permits multiple access by assigning different frequencies of the available bandwidth to different channels.

FEP - Front-End Processor - communications concentrator such as the IBM 3725 or COMTEN 3690 used to interface communications lines to host computers.

Field Engineer (FE) - Field engineer, customer engineer, serviceperson, and maintenance person are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Full-Duplex - Bi-directional communications with simultaneous two-way transmission.

General-Purpose Computer System - A computer designed to handle a wide variety of problems. Includes machine room peripherals, systems software, and small business systems.

Half-Duplex - Bi-directional communications, but only in one direction at a time.

Hardware Integrator - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator also may develop control system software in addition to installing the entire system at the end-user site.

HDLC - High-Level Data Link Control.

Hertz - Number of signal oscillations (cycles) per second - abbreviated Hz.

IBM Token Ring - IBM's local area network using baseband signalling and operating at 4 mbps on twisted-pair copper wire. Actually a combination of star and ring topologies – IEEE 802.5-compatible.

IDN - Integrated Digital Network - digital switching and transmission; part of the evolution to ISDN.

Independent Suppliers - Suppliers of machine room peripherals - usually do not supply general purpose computer systems.

Information Processing - Data processing as a whole, including use of business and scientific computers.

Installed Base - Cumulative number or value (cost when new) of computers in use.

Interconnection - Physical linkage between devices on a network.

Interoperability - The capability to operate with other devices on a network. To be contrasted with interconnection, which merely guarantees a physical network interface.

ISDN - Integrated Services Digital Network - integrated voice and non-voice public network service which is completely digital. Not clearly defined through any existing standards although FCC and other federal agencies are participating in the development of CCITT recommendations.

Keypunch Operators - Individuals operating keypunch machines (similar in operation to electric typewriters) to transcribe data from source materials onto punch cards.

Lease Line - Permanent connection between two network stations. Also known as dedicated or non-switched line.

Machine Repairers - Individuals who install and periodically service computer systems.

Machine Room Peripherals - Peripheral equipment that is generally located close to the central processing unit.

Mainframe - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more. Usually refers to traditional mainframes (such as IBM 30XX, Unisys (Sperry) 1100/XX, Honeywell DDPS88, Unisys (Burroughs) A15, or CDC (Cyber series).

MAP - Manufacturing Automation Protocol - seven-layer communications standard for factory environments promoted by General Motors/ EDS. Adopts IEEE 802.2 and IEEE 802.4 standards plus OSI protocols for other layers of the architecture.

Mean Time to Repair - The mean of elapsed times from the arrival of the field engineer on the user's site until the device is repaired and returned to user service.

Mean Time to Respond - The mean of elapsed times from the user call for services and the arrival of the field engineer on the user's site.

Message - A communication intended to be read by a person. The quality of the received document need not be high, only readable. Graphic materials are not included.

MMFS - Manufacturing Messaging Format Standard - application-level protocol included within MAP.

Modem - A device that encodes information into electronically transmittable form (MOdulator) and restores it to original analog form (DEModulator).

NCP - Network Control Program - software used in IBM 3705/3725 FEPs for control of SNA networks.

Node - Connection point of three or more independent transmission points which may provide switching or data collection.

Off-Line - Pertaining to equipment or devices that can function without direct control of the central processing unit.

On-Line - Pertaining to equipment or devices under direct control of the central processing unit.

OSI - ISO reference model for Open Systems Interconnection - seven-layer architecture for application, presentation, session, transport, network, data link, and physical services and equipment.

OSI Application Layer - Layer 7, providing end-user applications services for data processing.

OSI Data Link Layer - Layer 2, providing transmission protocols, including frame management, link flow control, and link initiation/release.

OSI Network Layer - Layer 3, providing call establishment and clearing control through the network nodes.

OSI Physical Layer - Layer 1, providing the mechanical, electrical, functional, and procedural characteristics to establish, maintain, and release physical connections to the network.

OSI Presentation Layer - Layer 6, providing data formats and information such as data translation, data encoding/decoding, and command translation.

OSI Session Layer - Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes.

OSI Transport Layer - Layer 4, providing end-to-end terminal control signals such as acknowledgements.

Overseas - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

PABX - Private Automated Branch Exchange - hardware that provides automatic (electro-mechanical or electronic) local circuit switching on a customer's premises.

PAD - Packet Assembler-Disassembler - a device that enables DTE not equipped for packet switching operation to operate on a packet switched network.

PBX - Private Branch Exchange - hardware which provides local circuit switching on the customer premise.

PCM - Pulse-Code Modulation - modulation involving conversion of a waveform from analog to digital form through coding.

PDN - Public Data Network - a network established and operated by a recognized private operating agency, a telecommunications administration, or other agency for the specific purpose of providing data transmission services to the public.

Peripherals - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.

PPM - Pulse Position Modulation.

Private Network - A network established and operated for one user or user organization.

Programmers - Persons mainly involved in designing, writing, and testing of computer software programs.

Protocols - The rules for communication system operation that must be followed if communication is to be effected. Protocols may govern portions of a network or service. In digital networks, protocols are digitally encoded as instructions to computerized equipment.

Public Network - A network established and operated for more than one user with shared access, usually available on a subscription basis. See related international definition of PDN.

Scientific Computer System - A computer system designed to process structured mathematics, such as Fast Fourier Transforms, and complex, highly redundant information, such as seismic data, sonar data, and radar, with large on-line memories and very high capacity throughput.

SDLC - Synchronous Data Link Control - IBM's data link control for SNA. Supports a subset of HDLC modes.

SDN - Software-Defined Network.

Security - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent or unauthorized disclosure to meet the requirements of the Privacy Act and national classified information regulations.

Service Delivery Point - The location of the physical interface between a network and customer/user equipment.

Simplex - Undirectional communications.

Smart Box - A device for adapting existing DTE to new network standards such as OSI. Includes PADs and protocol convertors, for example.

SNA - Systems Network Architecture-seven-layer communications architecture designed by IBM. Layers correspond roughly but not exactly to OSI model.

Software - Computer programs.

Supplies - Includes materials associated with the use or operations of computer systems, such as printer paper, keypunch cards, disk packs, and tapes.

Switched Circuit - Temporary connection between two network stations established through dial-up procedures.

Synchronous - Communications operation with separate, continuous clocking at both sending and receiving stations.

Systems Analyst - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

Systems House - Vendor that acquires, assembles, and integrates hardware and software into a total system to satisfy the data processing requirements of an end user. The vendor also may develop systems software products for license to end users. The systems house vendor does not manufacture mainframes.

Systems Integrator - Systems house vendor that develops systems interface electronics, applications software, and controllers for the CPU, peripherals, and ancillary subsystems that may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and testing of the completed system.

TI - Bell System designation for 1.544 mbps carrier capable of handling 24 PCM voice channels.

TDM - Time Division Multiplexing - a multiplexing method that interweaves multiple transmissions on a single circuit by assigning a different time slot to each channel.

Token Passing - Local area network protocol which allows a station to transmit only when it has the "token," an empty slot on the carrier.

TOP - Technical Office Protocol - protocol developed by Boeing Computer Services to support administrative and office operations as complementary functions to factory automation implemented under MAP.

Turnkey System - System composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

Twisted-Pair Cable - Communications cabling consisting of pairs of single-strand metallic electrical conductors, such as copper wires, typically used in building telephone wiring and some LANs.

Verification and Validation - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user.

Voice-Grade - Circuit or signal in the 300-3300 Hz bandwidth typical of the public telephone system - nominally a 4 KHz user.

VTAM - Virtual Telecommunications Access Method - host-resident communications software for SNA networks.

E
Other Considerations

When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures then are categorized according to what the users perceive they are buying.
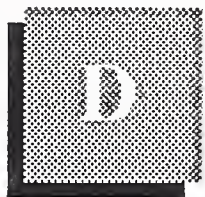
Appendix: Glossary of Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

A

Federal Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACO	Administrative Contracting Offices (DCAS).
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System.
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement.
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTOmatic DIgital Network of the Defense Communications System.
AUTOSEVOCOM	AUTOmatic SEcure VOice COMmunications Network.
AUTOVON	AUTOmatic VOice Network of the Defense Communications System.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C^2	Command and Control.
C^3	Command, Control, and Communications.
C^4	Command, Control, Communications, and Computers.
C^3I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CALS	Computer-Aided Automated Logistic System.
CAPS	Command Automation Procurement Systems.

CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	*Commerce Business Daily* - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program.
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CCTC	Command and Control Technical Center (JCS).
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act.
CIG	Computerized Interactive Graphics.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONtinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DCA	Defense Communications Agency.

DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office.
DECEO	DEfense Communications Engineering Office.
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DHHS	Department of Health and Human Services.
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DSCS	Defense Satellite Communication System.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.

EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRMR	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price - Labor/Hour Contract.
FP-LOE	Fixed-Price - Level-Of-Effort Contract.
FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Proposed replacement for the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.

GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDEP	Interservice Data Exchange Program.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
IXS	Information Exchange System.
JFMIP	Joint Financial Management Improvement Program.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).

|	
LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).

OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnection Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.

R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.

TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B

General and Industry Acronyms

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	Bell Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultaif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	COmmon Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processing Unit.
DBMS	Data Base Management System.
DRAM	Dynamic Random Access Memory.
EIA	Electronic Industries Association.
EPROM	Erasible Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value-Added Retailer.
VLSI	Very Large Scale Integration.
WORM	Write-Once-Read-Many-Times.
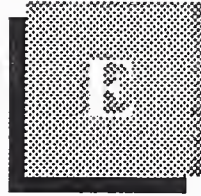
Appendix: Policies, Regulations, and Standards

A

OMB Circulars

A-11	Preparation and Submission of Budget Estimates.
A-49	Use of Management and Operating Contracts.
A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities.
A-76	Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
A-109	Major Systems Acquisitions.
A-120	Guidelines for the Use of Consulting Services.
A-121	Cost Accounting, Cost Recovery, and Integrated Sharing of DataProcessing Facilities.
A-123	Internal Control Systems.
A-127	Financial Management Systems.
A-130	Management of Federal Information Resources.
A-131	Value Engineering.

B

GSA Publications

The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.

C

DoD Directives

DD-5000.1	Major System Acquisitions.
DD-5000.2	Major System Acquisition Process.
DD-5000.11	DoD Data Elements and Data Codes Standardization Program.
DD-5000.31	Interim List of DoD-Approved High-Order Languages.
DD-5000.35	Defense Acquisition Regulatory Systems.
DD-5200.1	DoD Information Security Program.
DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.

	DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
	DD-7920.1	Life Cycle Management of Automated Information (AIS).
	DD-7920.2	Major Automated Information Systems Approval Process.
	DD-7935	Automated Data Systems (ADS) Documentation.

D

Standards	ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NBS FIPS 71.
	CCITT G.711	International PCM standard.
	CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.
	DEA-1	Proposed ISO standard for data encryption based on the NBS DES.
	EIA RS-170	Monochrome video standard.
	EIA RS-170A	Color video standard.
	EIA RS-464	EIA PBX standards.
	EIA RS-465	Standard for Group III facsimile.
	EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network.
	EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24.
	EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
	FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
	FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
	FED-STD 1041	Equivalent to FIPS 100.
	FED-STD 1061	Group II Facsimile Standard (1981).
	FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
	FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466.
	FED- STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
	FIPS 46	NBS Data Encryption Standard (DES).
	FIPS 81	DES Modes of Operation.
	FIPS 100	NBS Standard for packet-switched networks; subset of 1980 CCITT X.25.
	FIPS 107	NBS Standard for local area networks, similar to IEEE 802.2 and 802.3.

FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP).
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard.
IEEE 802.2	OSI-Compatible IEEE standard for data-link control in local area networks.
IEEE 802.3	Local area network standard similar to Ethernet.
IEEE 802.4	OSI-compatible standard for token-bus local area networks.
IEEE 802.5	Local area networks standard for token-ring networks.
IEEE P1003.1	POSIX standard, similar to FIPS 151.

MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
MIL-STD-1782	TELNET - virtual terminal protocol.
MIL-STD-1815A	Ada Programming Language Standard.
SVID	UNIX System Interface Definition.
X.12	ANSI standard for Electronic Data Interchange.
X.21	CCITT Standard for interface between DTE and DCE for synchronous operation on public data networks.
X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
X.75	CCITT standard for links that interface different packet networks.
X.400	ISO Application-level standard for the electronic transfer of messages (electronic mail).
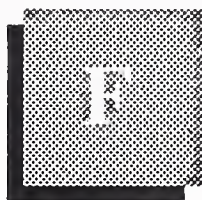
Appendix: Related INPUT Reports

A
Annual Market Analyses

Procurement Analysis Reports, FY1990-1995

B
Market Reports

Federal Professional Services Market, 1989-1994

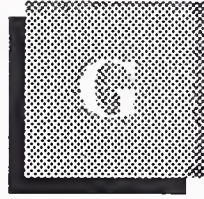*Federal Software and Related Services Market, 1989-1994*

Federal Systems Integration Market, 1989-1994

Federal Microcomputer Market, 1989-1994

Defense Logistics Agency Information Services Market

Federal Processing Services and Operations Support Market, 1989-1994

Federal Electronic Data Interchange Market, 1989-1994

Appendix: Federal Agency Questionnaire

Confidential

Agency Questionnaire
Federal Financial Systems Market

This questionnaire is directed to the study of the software and hardware which comprise financial systems in the federal government.

1a. What type of financial system software does your agency currently use?

_____

_____

_____

1b. Does your agency plan to acquire new financial software within the next five years?

____Yes   ____No

What type?_____

_____

_____

2. Does your agency plan to acquire a new financial system or an addition to your system within the next five years?

    ____Yes   ____No

3. Is your current system compliant with the JFMIP Core Requirements?

    ____Yes   ____No

    (If the answer is yes, go to question 4. If the answer is No, go to question 7.)

4a. Does your agency plan to expand financial reporting requirements to other areas.

    ____Yes   ____No

4b. What are the reporting areas under consideration?

    _____

    _____

5. Were the JFMIP Core Requirements a driving factor in your selection of financial software?

    ____Yes   ____No

6. What degree of customization did your system require?

    _____

    _____

    (If you answered question 6, please proceed from here to question 10.)

7. Does your agency plan to acquire an off-the-shelf financial system or to have a custom system developed?

    _____

    _____

8. Will you be acquiring financial systems software as a part of a larger hardware procurement?

    ____Yes   ____No

    What are the hardware requirements under this procurement?

    _____

    _____

9.   Will your agency follow the JFMIP Core Requirements when it procures a new financial system?

_____ G-3

_____

10.   Please rate the following evaluation criteria, from 1 to 5 (with 5 being most important) in selection of a financial systems vendor:

     _____Software products

     _____Software development expertise

     _____Available hardware environment

     _____Compliance with JFMIP standards

     _____Experience with federal financial systems

     _____Other (please specify)_____

11.   On what type of hardware does your system currently run?

_____

_____

12.   Are budget constrains an important factor in acquiring your financial software?

     _____Yes   _____No

Why or why not?
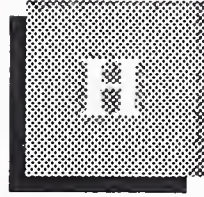
_____

_____

13.   Do you anticipate more restrictions and requirements on financial systems?

     _____Yes   _____No

Why or why not?

_____

_____

14.   Does your agency support any financial systems user groups? If so, please list them.

_____

_____

_____

15.   In your opinion, who are the leading financial software vendors?

_____

_____

_____

Appendix: Federal Oversight Agency Questionnaire

Confidential

Oversight Agency Questionnaire
Federal Financial Systems

This questionnaire is directed to the study of the hardware and software which comprise financial systems in the federal government.

1a. What has been the effect of the JFMIP Core Requirements on the federal financial systems market?

_____

_____

1b. What other regulations have played a part in the market?

_____

_____

2. How are agencies being made aware of the pertinent regulations?

_____

_____

3a. To what degree are agencies ignoring or rebelling against the Core requirements?

_____

_____

3b. What is the degree of compliance among the agencies?

_____

_____

4. How are the JFMIP Core Requirements being enforced on the agencies? What forces the agencies to comply?

_____

_____

5a. Do you expect JFMIP to affect other administrative systems, such as human resources or procurement?

____Yes   ____No

Which systems are the most likely to be affected?

_____

_____

6. Other than procuring a system from an approved vendor, what are other methods of obtaining compliant financial systems?

_____

_____

7. Are there any agencies who have not currently implemented SGL?

____Yes   ____No

Which agencies?

_____

8. In your opinion, who are the leading financial software vendors?

_____

_____

9.   What is being done, if anything, to encourage more software vendors to enter the market?

_____

_____

10.   Why are there so few companies entering this market now?

_____

_____

11.   How are oversight agencies assisting vendors in developing and marketing their products to the federal government?

_____

_____

12.   Are there certain types of companies that could be excluded from the financial systems market for any reason?

_____

_____

About INPUT

Company Profile

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/ consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and sevices (software, processing services, turnkey systems, systems integration, professional services, communications, and systems/software maintenance and support).

Many of INPUT's professional staff have more than 20 years experience in their areas of specialization. Most have held management positions in large organizations, enabling them to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

Staff Credentials

INPUT's staff have been selected for their broad background in a variety of functions, including planning, marketing, operations, and information processing. Many of INPUT's professional staff have held executive positions in some of the world's leading organizations, both as vendors and users of information services, in areas such as the following:

- Processing Services
- Professional Services
- Turnkey Systems
- Applications Software
- Field (customer) Service

- Banking and Finance
- Insurance
- Process Manufacturing
- Telecommunications
- Federal Government

Educational backgrounds include both technical and business specializations, and many INPUT staff hold advanced degrees.

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1. Market Analysis Program—U.S.
The Market Analysis Program provides up-to-date U.S. information services market analyses, five-year forecasts, trend analyses, vertical/cross-industry market reports, an on-site presentation, hotline inquiry service, and sound recommendations for action. It covers software, professional and network services, turnkey systems, and professional services markets. It is designed to satisfy the planning and marketing requirements of current and potential information services vendors.

2. Market Analysis Program—Europe
This program is designed to help vendors of software and services with their market planning. It examines the issues in the marketplace, from both a user and a vendor viewpoint. It provides detailed five-year market forecasts to help plan for future growth.

3. Vendor Analysis Program—U.S.
A comprehensive reference service covering more than 400 U.S. information services vendor organizations, VAP is often used for competitive analysis and prescreening of acquisition and joint-venture candidates. Profiles on leading vendors are updated regularly, and hotline inquiry service is provided.

4. Vendor Analysis Program—Europe
This is an invaluable service for gaining competitve information. Two binders are provided—one is a directory listing names, addresses, and turnover of some 700 European software and services vendors. The second binder contains profiles of about 300 key vendors.

5. Electronic Data Interchange Program—U.S.
Focusing on what is fast becoming a major computer/communications market opportunity, this program keeps you well informed. Through monthly newsletters, timely news flashes, comprehensive studies, a joint user/vendor conference, and telephone inquiry privileges, you will be informed and stay informed about the events and issues impacting this burgeoning market.

6. Network Services Program—Europe
Network services is a fast-growing area of the software and services industry. This program is essential to vendors of EDI, electronic information services, and network products and services. It keeps clients informed of the latest developments and includes a monthly newsletter on EDI.

7. Systems Integration Program—U.S.

Focus is on the fast-moving world of systems integration and the provision of complex information systems requiring vendor management and installation of multiple products and services. The program includes an annual market analysis of the U.S. systems integration and operations markets, SI vendor profiles and updates, topical market analysis reports, and an annual SI seminar.

8. Systems Operations Program—U.S.

This program includes an annual market analysis report of the systems operations and systems integration market, SO vendor profiles and updates, reports on network management and SO management practices, and an annual SO seminar.

9. Systems Integration Program—Europe

Systems integration and systems operations (facilities management) are key growth areas for the decade. This program examines these two areas and analyzes current market trends, user needs, and vendor offerings.

10. Federal Information Systems and Services Program

This program presents highly specific information on U.S. federal government procurement practices, identifies information services vendor opportunities, and provides guidance from INPUT's experienced Washington professionals to help clients maximize sales effectiveness in the federal government marketplace.

11. Information Systems Program

ISP is designed for executives of large information systems organizations and provides crucial information for planning, procurement, and management decision making. This program is widely used by both user and vendor organizations.

12. Customer Service Program—International

This program provides customer service organization management with data and analyses needed for marketing, technical, financial, and organizational planning. The program pinpoints user perceptions of service received, presents vendor-by-vendor service comparisons, and analyzes and forecasts service markets for large systems, minicomputers, personal computer systems, and third-party maintenance. A monthly newsletter helps clients keep informed of the latest developments in the market.

13. Customer Service Program—Europe

Customer service is an expanding area. Companies are now expanding from hardware service to more software-related maintenance and professional services. This program helps vendors penetrate these new areas and provides guidelines for future market strategy. A monthly newsletter helps clients keep abreast of the latest developments in the market.

14. Worldwide Information Services Market Forecasts, 1989-1994
In 1989 INPUT initiated this research study, which provides an
international forecast for the information services market.

15. INPUT's sales office in Japan
Provides research services on U.S. and global information services to
Japanese clients.

Customized Advisory Services	In addition to standard continuous-information programs, INPUT will work with you to develop and provide a customized advisory service that meets your unique requirements.
Acquisition Services	INPUT also offers acquisition services that are tailor-made for your requirements. INPUT's years of experience and data base of company information about information systems and services companies have helped many companies in their acquisition processes.
An Effective Combination	INPUT'S Executive Advisory Services are built on an effective combination of research-based studies, client meetings, informative conferences, and continuous client support. Each service is designed to deliver the information you need in the form most useful to you, the client. Executive Advisory Services are composed of *varied combinations of the following products and services:*

Research-Based Studies
Following a proven research methodology, INPUT conducts major
research studies throughout each program year. Each year INPUT selects
issues of concern to management. Topical reports are prepared and
delivered throughout the calendar year.

Information Service Industry Reports
INPUT's Executive Advisory Services address specific issues,
competitive environments, and user expenditures relative to:

Software	Professional Services
Processing/Network Services	Turnkey Systems
Systems Integration	Small-Systems Service
Telecommunications Service	Third-Party Maintenance
Office Systems	Large-Systems Service

Industry-Specific Market Reports

Detailed analyses of market trends, forces driving the markets, problems, opportunities, and user expenditures are available for the following sectors:

Discrete Manufacturing	Insurance
Process Manufacturing	Medical
Transportation	Education
Utilities	Business and Technical Services
Telecommunications	Consumer Services
Retail Distribution	Federal Government
Wholesale Distribution	State and Local Government
Banking and Finance	Other Industry Sectors

Cross-Industry Market Report

A separate analysis covers the following cross-industry application areas:

Accounting	Office Systems
Education and Training	Planning and Analysis
Engineering and Scientific	Other Cross-Industry Sectors
Human Resources	

Hotline: Client Inquiry Services

Inquiries are answered quickly and completely through use of INPUT's Client Hotline. Clients may call any INPUT office (California, New York, Washington D.C., London, or Paris) during business hours or they may call a unique voicemail service to place questions after hours. This effective Hotline service is the cornerstone of every INPUT Executive Advisory Service.

The Information Center

One of the largest and most complete collections of information services industry data, the Information Center houses literally thousands of up-to-date files on vendors, industry markets, applications, current/emerging technologies, and more. Clients have complete access to the Information Center. In addition to the information contained in its files, the center maintains an 18-month inventory of over 130 major trade publications, vendor consultant manuals, economic data, government publications, and a variety of important industry documents.

Access to INPUT Professional Staff

Direct access to INPUT's staff, many of whom have more than 20 years of experience in the information industry, provides you with continuous research and planning support. When you buy INPUT, you buy experience and knowledge.

Annual Client Conference
Each year, you can attend INPUT's Annual Client Conference. This event addresses the status and future of the information services industry, the competitive environment, important industry trends potentially affecting your business, the impact of new technology and new service offerings, and more.

You will attend with top executives from many of the industry's leading, fastest-growing, and most successful vendor companies—and with top Information Systems (IS) managers from some of the world's most sophisticated user organizations.

On-Site Presentation by INPUT Executives
Many of INPUT's programs offer an informative presentation at your site. Covering the year's research, this session is held in the fourth quarter of each calendar year.

Proprietary Research Service

INPUT conducts proprietary research that meets the unique requirements of an individual client. INPUT's custom research is effectively used:

For Business Planning
Planning for new products, planning for business startups, planning for expansion of an existing business or product line—each plan requires reliable information and analysis to support major decisions. INPUT's dedicated efforts and custom research expertise in business planning ensure comprehensive identification and analysis of the many factors affecting the final decision.

For Acquisition Planning
Successful acquisition and divestiture of information services companies requires reliable information. Through constant contact with information services vendor organizations and continuous tracking of company size, growth, financials, and management "chemistry," INPUT can provide the valuable insight and analysis you need to select the most suitable candidates.

For the Total Acquisition Process
INPUT has the credentials, the data base of company information, and—most importantly—the contacts to assist you with the total acquisition and/or partnering relationship processes:

- Due Diligence
- Schedules and Introduction
- Criteria & Definitions
- Retainer and Fee-Based
- Active Search

For Competitive Analysis

Knowing marketing and sales tactics, product capabilities, strategic objectives, competitive postures, and strengths and weaknesses of your competition is as critical as knowing your own. The career experience of INPUT's professionals—coupled with INPUT's collection and maintenance of current financial, strategic, tactical, and operational information about more than 400 active companies—uniquely qualifies INPUT to provide the best competitive information available today.

For Market and Product Analysis

Developing new products and entering new markets involves considerable investment and risk. INPUT regularly conducts research for clients to identify product requirements, market dynamics, and market growth.

More About INPUT...

- More than 5,000 organizations, worldwide, have charted business directions based on INPUT's research and analysis.

- Many clients invest more than $50,000 each year to receive INPUT's recommendations and planning information.

- INPUT regularly conducts proprietary research for some of the largest companies in the world.

- INPUT has developed and maintains one of the most complete information industry libraries in the world (access is granted to all INPUT clients).

- INPUT clients control an estimated 70% of the total information industry market.

- INPUT analyses and forecasts are founded upon years of practical experience, knowledge of historical industry performance, continuous tracking of day-to-day industry events, knowledge of user and vendor plans, and business savvy.

- INPUT analysts accurately predicted the growth of the information services market—at a time when most research organizations deemed it a transient market. INPUT predicted the growth of the microcomputer market in 1980 and accurately forecasted its slowdown in 1984.

For More Information ...

INPUT offers products and services that can improve productivity, and ultimately profit, in your firm. Please give us a call today. Our representatives will be happy to send you further information on INPUT services or to arrange a formal presentation at your offices.

For details on delivery schedules, client service entitlement, or Hotline support, simply call your nearest INPUT office. Our customer support group will be available to answer your questions.

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